

**MU123\_1**

**Using a scientific calculator**

**About this free course**

This free course is an adapted extract from the Open University course MU123 Discovering Mathematics [www.open.ac.uk/courses/modules/mu123](http://www.open.ac.uk/courses/modules/mu123?utm_source=openlearn&utm_campaign=ol&utm_medium=ebook).

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The Open University, Walton Hall, Milton Keynes, MK7 6AA

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## Introduction

The course describes some of the main features of a scientific calculator and encourages you to use your calculator, both for everyday arithmetic and for more complicated calculations that use the function keys as well. Key sequences, which describe which keys to press, are included in all the activities, so you can try out the ideas straightaway.

Due to the wide range of scientific calculators available, for the purposes of this course we will be concentrating on the Casio fx-83ES model. Other calculators may function differently to the methods described within this course.

This calculator is used on the Open University courses [Starting with maths (Y182)](http://www3.open.ac.uk/study/undergraduate/course/y182.htm) and [Discovering mathematics (MU123)](http://www3.open.ac.uk/study/undergraduate/course/mu123.htm), but would also be useful for many other courses requiring the use of a scientific calculator.

This OpenLearn course is an adapted extract from the Open University course [MU123 Discovering Mathematics](http://www.open.ac.uk/courses/modules/mu123?utm_source=openlearn&utm_campaign=ol&utm_medium=ebook).

## Learning outcomes

After studying this course, you should be able to:

* understand the basic functions on your calculator
* understand which calculator functions are needed for a given problem
* understand what may go wrong when entering calculations and know how to fix them
* apply knowledge of calculator functions to a range of mathematical calculations.

## 1 Getting to know your calculator

The first 11 sections describe how to use the calculator and how to perform different types of calculations. Section 12 contains a calculator reference guide that you can refer to as needed for some of the main key sequences.

This course is not an exhaustive list of all the calculator’s features. If you are using a different calculator, you should use the corresponding features of your own calculator to do the activities in this guide. You may need to refer to your calculator manual to do this.

Start of Box

You may be able to download the manual for your calculator from the manufacturer’s website.

End of Box

The first step in using your calculator effectively is to make sure that you are familiar with the layout of the keys on the keypad, and that you can understand the information on the display.

Figure 1 shows the different parts of the Casio fx-83ES calculator.

Start of Figure

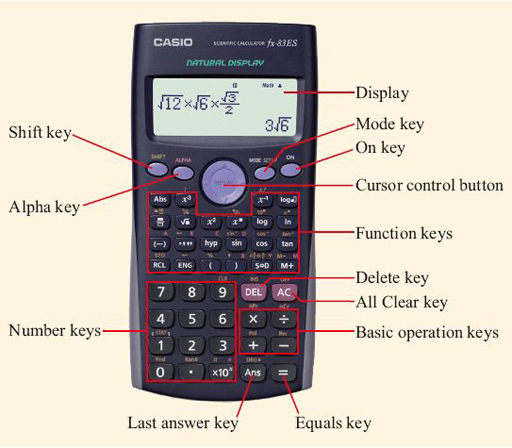


Figure 1 A typical scientific calculator

[View description - Figure 1 A typical scientific calculator](" \l "Session1_Description1)

[View description - Figure 1 A typical scientific calculator](" \l "Session1_Alternative1)

End of Figure

Start of Box

If you are using a different model of calculator, make sure that you can identify similar functions on your model.

End of Box

The calculator is switched on using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_110d05de91c067239039ed76b21b60428a33401d_key-on.jpgkey at the top right-hand corner of the keypad. Figure 2 shows the different elements of this calculator’s display.

Start of Box

Throughout this section, calculator keys will be indicated using the symbol on the key enclosed in a box, for example D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_110d05de91c067239039ed76b21b60428a33401d_key-on.jpg.

End of Box

Start of Figure

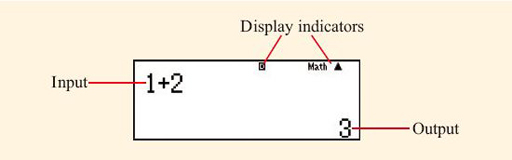


Figure 2 The calculator display

[View description - Figure 2 The calculator display](" \l "Session1_Description2)

[View description - Figure 2 The calculator display](" \l "Session1_Alternative2)

End of Figure

The lower half of the keypad contains the number keys, keys for the basic operations of addition, subtraction, division and multiplication, and the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgkey, which is pressed when you want the calculator to display the result of the calculation you have entered. The keys D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_52eb3db5b65acaf2a32886722b903f76373e4f28_key-open.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5166951880947d5310cdf8e54a629e03e346eb94_key-close.jpgused to insert brackets into a calculation are in the centre of the row above the number keys.

Many keys on the calculator have more than one use. The main function of a key is printed in white on the key itself. The second function of the key is printed in yellow above the key, and is accessed by pressing the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgbutton before pressing the key. When you press the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgbutton, the symbol ‘D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_61a7156992253eff4438e39b1355b94aa83eab67_inverse-s.jpg’ appears at the top left-hand corner of the calculator display to remind you that the button has been pressed. It disappears when you press another key. Some keys also have a third function, printed above the key in red. These functions allow numerical values stored in the calculator memories to be used within calculations and are accessed by pressing the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aaf4afe981155a9c3ea57ed36b35e24403fc4d00_key-alpha.jpgbutton before the appropriate key. When the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aaf4afe981155a9c3ea57ed36b35e24403fc4d00_key-alpha.jpgbutton is pressed, the symbol ‘D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ac7ea5e1eeb6da87f5f8225723380b964b80bec2_inverse-a.jpg’ is shown at the top of the calculator display. You will learn how to use the calculator memories later in section 4.

Start of Box

The calculator manual describes this second function as the ‘alternate’ function of the key.

End of Box

Some calculator operations are accessed through a system of menus that are displayed on the calculator screen, as shown in Figure 3. The required menu option is selected by pressing the number key associated with the option, as given on the calculator screen.

Start of Box

Start of Figure

The figure shows the display on a calculator screen containing four lines of text.

Figure 3 A typical calculator on-screen menu

[View description - Figure 3 A typical calculator on-screen menu](" \l "Session1_Description3)

[View description - Figure 3 A typical calculator on-screen menu](" \l "Session1_Alternative3)

End of Figure

End of Box

When describing how to use various calculator functions, this guide gives the exact keys that you need to press using the symbols shown on the keys. This is known as a ‘key sequence’. If the key sequence accesses the second function of a key, or a function from a menu, the name of this function will be given in brackets at the appropriate point in the key sequence. Names in brackets are thus not keys that you press but simply describe the function that is accessed using the previous key sequence. For example, to turn off the calculator, press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpg(OFF). In this notation, (OFF) is not a key that you press, but is the name of the second function of the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpgkey, which is accessed with the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgkey.

The calculator has many modes of operation that affect how mathematics is entered and displayed. These will be described later in this guide, but before progressing any further you should reset your calculator to the default course settings.

Start of Activity

**Activity 1 Initialising your calculator**

Start of Question

To initialise your calculator to the default course settings, turn it on and then enter the following two key sequences:

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9af3914e032e2a4e3dbf7386b6fe513c9522b08f_key-9.jpg(CLR) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpg(Setup) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg(Yes) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpg

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bb0876d13b59b612b82868ef4bc57748de86f774_key-8.jpg(Norm) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg

Note that in the first key sequence, ‘CLR’ (which is short for ‘clear’) is the second function of the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9af3914e032e2a4e3dbf7386b6fe513c9522b08f_key-9.jpgkey, and ‘Setup’ is the name of the on-screen menu option corresponding to the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgkey. ‘Yes’ is the name of the on-screen menu option corresponding to the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgkey. This key sequence clears all previous ‘setup’ settings on the calculator.

In the second key sequence, ‘SETUP’ is the name of the second function of the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpgkey, and ‘Norm’ (short for ‘normal’) is the on-screen menu option corresponding to the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bb0876d13b59b612b82868ef4bc57748de86f774_key-8.jpgkey. Pressing the key D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgselects to use ‘Normal 2’ mode, which will be described in more detail in section 5.

Start of Box

Note the difference between ‘SETUP’, the second function of the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpgkey, and the menu option ‘Setup’.

End of Box

Your calculator will now be working in ‘Math’ mode, and the word Math will be shown near the right-hand side of the top of the calculator display, as shown in Figure 4 below. Math mode is the recommended way of using your calculator during this course as it allows mathematics to be entered and displayed in a similar way to how you would write it on paper.

Start of Box

Start of Figure

The figure shows the display on a calculator screen.

Figure 4 ‘Math’ mode

[View description - Figure 4 ‘Math’ mode](" \l "Session1_Description4)

[View description - Figure 4 ‘Math’ mode](" \l "Session1_Alternative4)

End of Figure

End of Box

End of Question

End of Activity

## 1.1 Basic calculations

Basic calculations are entered into the calculator in exactly the same order as they are written on paper, as demonstrated in the following activity. The calculator displays the calculation that you enter. When you press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg, the answer is displayed at the bottom right of the screen.

Start of Activity

**Activity 2 Sums, differences, products and quotients**

Start of Question

Use your calculator to work out the answers to the following calculations.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3a8494ce1e8dfeebb705b4d9c29a2f741b1e4315_img-0001.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ab3481804ca7cf66813e5911126b79a9d224fdf5_img-0003.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_54076ad6e912fa96cb1a037926fd597dc0c97b44_img-0005.jpg
4. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a85997db171863aa9a4a72bff5dc63cb6701aac1_img-0007.jpg

End of Question

[View answer - Activity 2 Sums, differences, products and quotients](" \l "Session1_Answer1)

End of Activity

You may have noticed that in part (4) of the above activity, the calculation was too long to fit on the calculator display. In such circumstances, the symbols ‘D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4f77a829fbafb452f93c391c26d5ad7c31b69625_img-0009.jpg’ or ‘D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_143ac940acb873d0e4f1db6a9a767ff596edfa3a_img-0010.jpg’ appear at the left or right of the display to indicate that there is more information in that direction. This information can be seen by scrolling left or right using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a9f0987246ee7951f138e2c03a40c14401ff909f_key-left.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpgkeys, which are found at the left and right sides of the large cursor control button (labelled with the word ‘REPLAY’) located under the calculator screen.

If  you  type  a  very  long  calculation  into  your  calculator,   then  you  may see the  cursor   (which  is  usually  shown  as ‘ D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6028c2f1e98380dfbd992f2394b0bbddc113ee38_cursor.jpg’) change  to  ‘D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ca2d8e072b30131e25a3705e2750f59d0a31835a_blockcursor.jpg’. This means that you are allowed to type only at most 10 more characters. If you encounter this, you should break your calculation into smaller parts.

Start of Box

The cursor is a flashing symbol indicating where the next item entered into the calculator will appear.

End of Box

## 1.2 Fractions or decimals?

In Activity 1 you set up your calculator to use Math mode. In this mode, when the result of a calculation is not a whole number, it will be displayed as a fraction, such as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_b36a4ff8584a53e5ac54a16f238b825b03030746_img-0012.jpg, wherever possible.

To obtain the answer in decimal form, you need to press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpginstead of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg, or you can toggle between the fractional and decimal outputs using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpgkey.

Start of Box

Remember, your calculator is in Math mode if the word Math is shown at the top of the calculator display. If your calculator is not in Math mode, repeat the steps of Activity 1.

End of Box

Start of Activity

**Activity 3 Fractions and decimals**

Start of Question

Use your calculator to find D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0e9796599de0c71af5afbb32346b89b0eedfa53f_img-0013.jpgin both fractional and decimal forms.

End of Question

[View answer - Activity 3 Fractions and decimals](" \l "Session1_Answer2)

End of Activity

## 1.3 Powers

There are several keys on the calculator that enable you to perform calculations involving powers. For small powers such as squares or cubes there are dedicated buttons, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7f9deb4302c6e12564d6c269b6e57c4e0b630e4a_key-x2.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd13e246339fd37e08c0fc1fe536a4054d0b4765_key-x3.jpg, which are located in the function key area of the keypad. These are used in a similar manner to how you would write mathematics; for example, to enter D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8cecbb9e02cf71ffa51d0c5271817c81a144bd8e_img-0016.jpgyou would press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7f9deb4302c6e12564d6c269b6e57c4e0b630e4a_key-x2.jpg. The display also shows the maths in the same way as you would write it on paper.

To calculate higher powers, for example D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0a5957ec302b9912651da1bdee54827c2a1f3987_img-0017.jpg, you need to use the more general power key D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpg. This is again used in a natural way. To enter D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0a5957ec302b9912651da1bdee54827c2a1f3987_img-0017.jpg, you use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_af12d54b4fec73d8d2a9a64f8fda3dc2bc9d06fc_key-5.jpg. Note that after you press the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgkey, a small box is shown on the calculator display containing the flashing cursor (‘ D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6028c2f1e98380dfbd992f2394b0bbddc113ee38_cursor.jpg’), which enables you to enter the power in the correct place. To move the cursor away from this box and back to the main line of the display once the power has been entered, press the right arrow key D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpgat the right-hand side of the large cursor control button.

Start of Figure

The figure shows the display on a calculator screen.

Figure 5 The general power key function

[View description - Figure 5 The general power key function](" \l "Session1_Description5)

[View description - Figure 5 The general power key function](" \l "Session1_Alternative5)

End of Figure

Start of Box

Other models of calculator may have the button D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d7e8aa187af0584d65a21bd28dd63ef76e93b3e4_key-caret.jpginstead of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgand may not have specific D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7f9deb4302c6e12564d6c269b6e57c4e0b630e4a_key-x2.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd13e246339fd37e08c0fc1fe536a4054d0b4765_key-x3.jpgkeys.

End of Box

Start of Activity

**Activity 4 Calculating powers**

Start of Question

Calculate each of the following using your calculator.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d7a32e0453fdda6bf96c7bacaa8661a1ee15b99b_img-0018.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2ebcfe9630d1415636e49f4d3e045169a843d390_img-0020.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_077da5a43daa8fa77476a86877c92ea4623a65bf_img-0022.jpg

End of Question

[View answer - Activity 4 Calculating powers](" \l "Session1_Answer3)

End of Activity

## 1.4 Making corrections

If you make a mistake when entering a key sequence into the calculator, you can use the editing facilities to correct your error.

The D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a9f0987246ee7951f138e2c03a40c14401ff909f_key-left.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpgkeys on the large cursor control button enable you to move the cursor (shown on the display as ‘ D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6028c2f1e98380dfbd992f2394b0bbddc113ee38_cursor.jpg’) within a calculation on the calculator screen. Characters can then be inserted at the cursor location simply by pressing the appropriate buttons, and items to the left of the cursor can be deleted using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bac0010ff0f9bda49320e0712fa10cd12571c556_key-del.jpgkey. This can be done either before or after the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgkey has been pressed. To re-evaluate an edited calculation, simply press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgat any time.

In some circumstances, however, it may be easiest to abandon what you have typed and start again, by pressing the ‘all clear’ D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpgkey!

If a severe error is made when entering a calculation into the calculator, it may prevent the answer being calculated at all, as the calculation may not make mathematical sense. In such circumstances a ‘Syntax Error’ will be displayed as shown in Figure 6. The Syntax Error screen gives you two options:

* Press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpgto abandon the calculation and clear the screen
* press either D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a9f0987246ee7951f138e2c03a40c14401ff909f_key-left.jpgor D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpgto return to the erroneous calculation with the editing cursor placed at the point of the error, ready for a correction to be made

Start of Figure

The display on a calculator screen containing three lines of text showing Syntax Error.

Figure 6 Syntax Error

[View description - Figure 6 Syntax Error](" \l "Session1_Description6)

[View description - Figure 6 Syntax Error](" \l "Session1_Alternative6)

End of Figure

Other types of calculator error that you may encounter are:

* ‘Math Error’, when the calculation you entered makes mathematical sense but the result cannot be calculated, such as attempting to divide by zero, or when the result is too large for the calculator to handle.
* ‘Stack Error’, when your calculation is too complex to be handled in one go – in such circumstances, try to break the calculation into a number of simpler ones.

Start of Box

Section 4 considers how you might do this.

End of Box

In these cases, the calculator will display a screen similar to that for the Syntax Error, allowing you to either abandon or correct your calculation.

Start of Activity

**Activity 5 Making corrections**

Start of Question

Enter the following key sequence into your calculator in an (erroneous) attempt to calculate D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c935089159d9efcaa3fab6678435a8fda714126f_img-0025.jpg:

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_52eb3db5b65acaf2a32886722b903f76373e4f28_key-open.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_351bc4ecdd964919c7fc80a608389ccaa2c86f6c_key-plus.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7f9deb4302c6e12564d6c269b6e57c4e0b630e4a_key-x2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg

What should the correct answer be, and why does this key sequence not give it?

Use the calculator editing functions to correct the inputted key sequence.

End of Question

[View answer - Activity 5 Making corrections](" \l "Session1_Answer4)

End of Activity

## 2 Using your calculator for negative numbers

There are two different mathematical uses for the minus sign (-):

* as the symbol for subtraction, as in D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0fa099bf46dc2cd992e2ae9a91fd39030dfbb24a_img-0028.jpg
* to indicate a negative number such as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4b46f3264f2e4b02035037a0865d8d6bb1d81aeb_img-0029.jpg.

Corresponding to these there are two different minus sign keys on the calculator:

* D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4ab5fa6b01a08f5e9aaac41df0c1e527a179f0fd_key--.jpg, which is used for the operation of subtraction, as in D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_af12d54b4fec73d8d2a9a64f8fda3dc2bc9d06fc_key-5.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4ab5fa6b01a08f5e9aaac41df0c1e527a179f0fd_key--.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg
* D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_166e4831767cbacecf63fa701dbfb8046359a705_key-neg.jpg, which is used for negative numbers, e.g.  D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_166e4831767cbacecf63fa701dbfb8046359a705_key-neg.jpg  D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg.

In fact, some calculators permit the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4ab5fa6b01a08f5e9aaac41df0c1e527a179f0fd_key--.jpgkey to be used for both purposes, but many other calculators require the equivalent of the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_166e4831767cbacecf63fa701dbfb8046359a705_key-neg.jpgkey to be used for negative numbers. For this reason we shall use D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_166e4831767cbacecf63fa701dbfb8046359a705_key-neg.jpgto input negative numbers throughout this guide.

Note that if you attempt to use D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_166e4831767cbacecf63fa701dbfb8046359a705_key-neg.jpgfor subtraction, for example D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_166e4831767cbacecf63fa701dbfb8046359a705_key-neg.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg, you will generate a Syntax Error.

Start of Activity

**Activity 6 Subtraction and negative numbers**

Start of Question

Calculate each of the following using your calculator. In each case, give your answer as a decimal not as a fraction.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fee2c82dca30e5362b024e0b79b9c68bb0182f50_img-0030.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5963872468ad55af20a0fc68b81ebba425e06c9f_img-0032.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5f8870b6f3b87bd339ad653241a816bd5cc898e5_img-0034.jpg
4. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c39ef82f67db65ca30e32883c023b813b2274379_img-0036.jpg
5. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6edb44e096749a847ab5731c04ad67265570dbcd_img-0038.jpg

End of Question

[View answer - Activity 6 Subtraction and negative numbers](" \l "Session2_Answer1)

End of Activity

You may have been surprised that the correct answer to part (5) is negative. According to the BIDMAS rules, the squaring is performed first, then the negative taken. If we wanted to calculate the square of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9782f41a62333dee4603edca6409e4fd0b97e28a_img-0042.jpg, we write this mathematically as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_38b0f47687ef216cee435eee21d744411397d7a4_img-0043.jpgand would need to use the brackets when evaluating it on a calculator.

## 3 Using your calculator for fractions

When your calculator is in Math mode, as recommended, fractions are entered using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_27d0e825110cc5356eb38d8cda4c5598770b580f_key-frac.jpgbutton in the left-hand column of the function key area of the calculator keypad. This displays a fraction ‘template’ on the display – as shown in Figure 8 below – that contains boxes that need to be ‘filled in’. When the button is first pressed, the cursor is located in the top box ready for you to enter the numerator. To move to the bottom box to enter the denominator, use the cursor down key D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpg. If there are further parts of a calculation to be entered when the template has been completed, the right cursor key D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpgcan be used to move out of the denominator in preparation for the input of the rest of the calculation.

Start of Figure



Figure 8 A fraction template

[View description - Figure 8 A fraction template](" \l "Session3_Description1)

[View description - Figure 8 A fraction template](" \l "Session3_Alternative1)

End of Figure

Start of Box

Remember, your calculator is in Math mode if the word Math is shown at the top of the calculator display. If your calculator is not in Math mode, repeat the steps of Activity 1.

End of Box

Mixed numbers such as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d3220edf26e541c459e0bcc7394b944c2d193b85_img-0044.jpgcan be entered similarly using the mixed number template obtained using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_27d0e825110cc5356eb38d8cda4c5598770b580f_key-frac.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5e52f21e54014ee492c0387cea2a3509f15fcf74_key-frac2.jpg. This template provides three boxes to fill, one for the whole number part, and one each for the numerator and denominator of the fractional part.

Any fractional answers to calculations will automatically be displayed in lowest terms.

Start of Activity

**Activity 7 Fractions**

Start of Question

Use your calculator to:

1. express D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f3855cf6a70d8ef5574f9315949d52db78d75cd3_img-0045.jpgin its simplest form
2. calculate D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_906cbba378a1fb4852a53c04693602c6397d4539_img-0047.jpgof 190.

End of Question

[View answer - Activity 7 Fractions](" \l "Session3_Answer1)

End of Activity

You may have noticed that the results of both these exercises were displayed on the calculator as top-heavy fractions. This is the default behaviour of the calculator in Math mode. You can toggle between a top-heavy fraction and its mixed number equivalent using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_25991213f3a7daf91ca96cf79710cb3434de5b1a_key-abc-dc.jpg.

The default behaviour of the calculator can be changed as follows:

* To set the calculator to use mixed numbers by default, use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP)D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpg(ab/c).
* To set the calculator to use improper or top-heavy fractions by default, use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg(d/c).

Start of Box

Here, the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgkey is used to access part of the on-screen menu that is not initially visible.

End of Box

Start of Activity

**Activity 8 Mixed numbers**

Start of Question

Use your calculator to:

1. express D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f3855cf6a70d8ef5574f9315949d52db78d75cd3_img-0045.jpgas a mixed number in its simplest form
2. express D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dcc9a402dbcc23b6f682da0faa7357d2f05ed5d1_img-0053.jpgas a top-heavy fraction.

End of Question

[View answer - Activity 8 Mixed numbers](" \l "Session3_Answer2)

End of Activity

## 4 Doing longer calculations using your calculator

The volume of wood (in cubic metres) contained in a log of length D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a134a05442f320813119ef0efc76851eec8848b9_img-0055.jpgmetres with a distance around its middle of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_69a57b0aa3626d927b4a00da1566f29dec3c93a3_img-0056.jpgmetres is given by the formula

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d72bf63abd60c2c6aa05b04849ebd1dbc1024c37_img-0057.jpg

For a log of length 1.5 m with a distance around the middle of 92 cm, this becomes

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_037cc3affa755b0a751736c8c5b93c7c17eeab66_img-0060.jpg

In this section we consider several different approaches that can be used to evaluate this and other more complex expressions using different functions on your calculator. While the first method – considered in Activity 9 – is probably the most straightforward for this relatively simple expression, it is useful to see how you might use other calculator functions when you are faced with more complicated expressions to evaluate.

The expression for the volume of wood requires the value of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpg. You could enter an approximate value for D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpgby hand, but this is time-consuming and may be prone to error. The calculator has an approximation for D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpgbuilt into it, which is obtained using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_662f03223cc6a43392ef3d83e4ec960a2964c41d_key-x10x.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2e5da5bbacd735b382f9da452646e7cc37955670_key-pi.jpg.

Start of Box

The D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_662f03223cc6a43392ef3d83e4ec960a2964c41d_key-x10x.jpgkey is located on the bottom row of the keypad.

End of Box

Start of Activity

**Activity 9 Using the fraction key**

Start of Question

The most obvious way of calculating D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fcd47d72dd9eee8a76976469cf9fcc63eb1eeace_img-0064.jpgis to enter it as a fraction on your calculator.

What key sequence is needed, and what is the final answer to 3 significant figures?

End of Question

[View answer - Activity 9 Using the fraction key](" \l "Session4_Answer1)

End of Activity

Another way to carry out the calculation in Activity 9 is to use the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_237f01f7152527615c5beec3ca139f2e332bc05b_key-div.jpgkey.

Start of Activity

**Activity 10 Using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_237f01f7152527615c5beec3ca139f2e332bc05b_key-div.jpg****key**

Start of Question

You will not obtain the correct answer to the calculation

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_40a506067e7b6653e3e61eb2ceb9adb4f6e801ae_img-0062.jpg

if you type

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_67612a769d22746b1d921d58a1ea013986b7cb3f_img-0067.jpg

into your calculator and press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg. Can you explain why? Insert a pair of brackets into the expression with the ÷ sign so that it will give the correct answer. Then type this new expression into the calculator and check that you obtain the same answer as in the activity above.

End of Question

[View answer - Activity 10 Using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_237f01f7152527615c5beec3ca139f2e332bc05b_key-div.jpg](" \l "Session4_Answer2)key

End of Activity

## 4.1 Reusing a previous result

An alternative approach to our calculation is to calculate the denominator of the fraction first, and then divide the numerator by this.

You could write down the answer to the first part of the calculation on paper, and enter it into the calculator again. However, it is possible that you may make an error either in writing down the number or in typing it into the calculator. A better method is to use the fact that the calculator retains the last calculated answer, which can then be inserted in the subsequent calculation using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c644a33df58f7bb6a005b4065e19b11c67ece4d9_key-ans.jpgkey located at the bottom of the keypad.

Start of Box

Note that the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c644a33df58f7bb6a005b4065e19b11c67ece4d9_key-ans.jpgkey only remembers the result of your last calculation.

End of Box

Start of Activity

**Activity 11 Bottom first!**

Start of Question

Use your calculator to calculate the value of the denominator of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_40a506067e7b6653e3e61eb2ceb9adb4f6e801ae_img-0074.jpg, then complete the calculation by finding the value of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d3b01064cc3c7fb3b69e82a8e526c55f780ca963_img-0075.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c644a33df58f7bb6a005b4065e19b11c67ece4d9_key-ans.jpgto 3 significant figures.

End of Question

[View answer - Activity 11 Bottom first!](" \l "Session4_Answer3)

End of Activity

## 4.2 Using the calculator memory

A variation on the above method is to break the calculation into two parts, and use the memory functions of the calculator to store the result of the first part. The calculator memory is particularly useful when you want to calculate the values of several expressions that have a common part. This common part need be entered only once and its value reused several times subsequently. For example, rewriting the formula for the volume of wood contained in a log as

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6017340ed821588c3b7da5a5ded7c839fb4a05c6_img-0076.jpg

we can see that no matter what the values of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a134a05442f320813119ef0efc76851eec8848b9_img-0055.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_69a57b0aa3626d927b4a00da1566f29dec3c93a3_img-0056.jpg, the formula always requires the value of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2f3295d0d1e90c9d46d2a94220c6946e95477227_img-0077.jpg. If we wished to calculate the volume of wood contained in several different logs, it might be efficient to calculate the value of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2f3295d0d1e90c9d46d2a94220c6946e95477227_img-0077.jpgonce, store it in memory and reuse this value in the subsequent calculations.

The calculator has several different memories. We shall first consider the ‘M’ memory, which is accessed using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpgkey (and its associated functions) at the bottom right-hand corner of the function key area.

Before using the calculator memory, it is good practice to always clear any previous data stored in the calculator using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9af3914e032e2a4e3dbf7386b6fe513c9522b08f_key-9.jpg(CLR) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg(Memory) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg(Yes) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpg.

Start of Box

Note that this clears all the calculator memories.

End of Box

To store the result of an expression just calculated (i.e. an answer displayed in the output area of the calculator screen) in the ‘M’ calculator memory, use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(STO) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M). Here we are using the second function of the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(or recall) button, which is called ‘STO’ (or store). After selecting the store function, we need to tell the calculator which memory the value is to be stored in. These memories are labelled in red on some of the calculator keys, and the ‘M’ memory is obtained by pressing the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpgkey. We could read the key sequence as ‘store the current result into the M memory’.

Start of Box

Once D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(or D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(STO)) has been pressed, the display indicator RCL (or STO) is shown on the display to indicate that the calculator is waiting to know which memory to recall (store) the value from (in).

End of Box

To display the current contents of the ‘M’ memory, press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M). The value stored in memory can also be used as part of a subsequent calculation by inserting the ‘letter’ M into the appropriate point of the expression using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aaf4afe981155a9c3ea57ed36b35e24403fc4d00_key-alpha.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M). For example, to find the square of the value currently stored in the ‘M’ memory, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a9882fd461f29e5493f43af308b20325788c01e1_img-0078.jpg, we can use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aaf4afe981155a9c3ea57ed36b35e24403fc4d00_key-alpha.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7f9deb4302c6e12564d6c269b6e57c4e0b630e4a_key-x2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg.

Start of Box

When there is a value stored in the ‘M’ memory, the display indicator M is shown at the top of the display.

End of Box

Start of Activity

**Activity 12 Using memory**

Start of Question

Store the value of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2f3295d0d1e90c9d46d2a94220c6946e95477227_img-0077.jpgin the ‘M’ memory of the calculator and then use this stored value to evaluate D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d4f798fe4720dbf61152afe8a61485415e295a40_img-0079.jpgto 3 significant figures.

End of Question

[View answer - Activity 12 Using memory](" \l "Session4_Answer4)

End of Activity

## 4.3 Other ‘M’ memory operations

The value stored in the ‘M’ memory can also be changed by adding or subtracting the result of a further calculation:

* To add the result of the latest calculation to the value currently in the memory, press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg.
* To subtract the value of the latest calculation from the value currently in the memory, use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M-).

Expressions can also be stored in, added to or subtracted from the memory at the same time as they are evaluated by replacing the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgat the end of a calculation with one of the memory access sequences. For example, to calculate D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_43183e8112f7bf07e326329cc7c2107bc1d391d2_img-0080.jpgand store the result straight into the memory, use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6f9d3543c2778855ca12212301982acf426476fa_key-4.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4ab5fa6b01a08f5e9aaac41df0c1e527a179f0fd_key--.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2324031796fdd05882a4b5eed7b01b99772ef473_key-6.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(STO) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M).

Start of Box

To clear the ‘M’ memory alone, simply store the value 0 in it using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_06c2925d159ad5bee96af6350370e37617e1ce30_key-0.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(STO) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M).

End of Box

## 4.4 Other memories

The calculator also has 6 other memories, labelled ‘A’, ‘B’, ‘C’, ‘D’, ‘X’ and ‘Y’, which are accessed using several of the keys in the lower half of the function key area of the calculator. Each memory name is printed in red above the key used to access it.

These memories can be used in exactly the same way as the ‘M’ memory, except that there are no equivalents to the ‘add to memory’ (D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg) and ‘subtract from memory’ (D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M-)) functions, and no display indicators.

## 5 Scientific notation on your calculator

## Displaying numbers in scientific notation on your calculator

If the result of a calculation is a number greater than or equal to D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7cfc35b5ab9990a3c836f51455f10e65a5440bd1_img-0081.jpg(i.e. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e80558572335a69f12f78c5778781044e4535a7b_img-0082.jpg), the calculator will automatically display the result using scientific notation. For example, calculating D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c6004066e80219bd456ee2e518e7d72556b488b6_img-0083.jpggives the answer

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_136d570495f61b6ecda7caba827b4fb4be61648e_img-0084.jpg,

which is displayed on the calculator screen as it is written here.

Small numbers are also automatically displayed using scientific notation. However, how small the number needs to be for this to happen depends on the mode the calculator is working in:

* ‘Norm 1’ mode uses scientific notation for any number less than D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1584a57ca092cd1532bcb261dabc832b96c0eb1c_img-0085.jpgbut greater than D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4258b724e111df38dc4eff1e91fbb6fc557f71da_img-0086.jpg.
* ‘Norm 2’ mode uses scientific notation for any number less than D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_153d75c78f7354e97cdd161dbb1b0a629be2ff74_img-0087.jpgbut greater than D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a4ce4531fb0129099ea9001b035bc718f5e25a07_img-0088.jpg.

Start of Box

‘Norm’ is short for ‘normal’.

End of Box

In Activity 1 you will have already set your calculator to use Norm 2 mode, and we suggest that for the moment you continue to use this. To change the mode, use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bb0876d13b59b612b82868ef4bc57748de86f774_key-8.jpg(Norm) followed by D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpg(for Norm 1) or D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg(for Norm 2).

You can also set the calculator to always display results using scientific notation with a set number of significant figures using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_634d7962d2548a77512edd656f053c3b3b82d843_key-7.jpg(Sci) followed by the number of significant figures required, for example D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg. When your calculator is set in this fashion, the display indicator SCI is displayed at the top of the screen. To cancel such a setting, use one of the key sequences given above to return to a ‘Norm’ mode.

## 5.1 Inputting numbers in scientific notation to your calculator

Numbers expressed in scientific notation can be input directly to the calculator by using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_662f03223cc6a43392ef3d83e4ec960a2964c41d_key-x10x.jpgkey on the bottom row of keys. For example, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7c14d177603fc7af3d1fdb113c838efb9e969888_img-0089.jpgcan be entered using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ad8fb9e28f2be6ac10fd0ad53f1697fce36c49f3_key-point.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_662f03223cc6a43392ef3d83e4ec960a2964c41d_key-x10x.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6f9d3543c2778855ca12212301982acf426476fa_key-4.jpg.

Start of Activity

**Activity 13 Calculating with scientific notation**

Start of Question

Use the scientific notation functions of your calculator to calculate each of the following, giving your answer in both scientific and ordinary forms.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1b8552a61d44879889ce9110988da3201fb4a16_img-0090.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_abfe14fa543eb3b1567b5c427f536d9c94ec3148_img-0092.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_528769c1c3f269e9e03420679b620cc4b62115f1_img-0094.jpg

End of Question

[View answer - Activity 13 Calculating with scientific notation](" \l "Session5_Answer1)

End of Activity

## 6 Powers and surds on your calculator

## Inputting fractional and negative powers

In Activity 4 you saw how to use the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgkey to input powers on the calculator. The D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgkey can be used with other functions, such as the fraction template D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_27d0e825110cc5356eb38d8cda4c5598770b580f_key-frac.jpg, to calculate fractional and negative powers.

Start of Activity

**Activity 14 Calculating more powers**

Start of Question

Calculate each of the following using your calculator, giving your answer correct to 3 significant figures.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0da9c9fdef8bfe2fdd1f7c621ebd66567e27ffda_img-0096.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d09e64aeddc2c90298df12e6094f4027cf6d6b5d_img-0098.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_000ae25addb3954304a5b060c34733729817a47c_img-0100.jpg

End of Question

[View answer - Activity 14 Calculating more powers](" \l "Session6_Answer1)

End of Activity

## 6.1 Using roots on your calculator

Just as there are keys on your calculator for entering powers, roots can also be entered directly. Square roots can be calculated using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ee71732e6209545c781c413ea079b68dc26447bf_key-sqrt.jpgkey. For example, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_b7e3d6768db28998fe54f26086e34caf5b617158_img-0102.jpgcan be entered using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ee71732e6209545c781c413ea079b68dc26447bf_key-sqrt.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg. Cube roots are entered using the second function of this key. For higher roots, such as fourth or fifth roots you need to use the more general D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1b6476a45882d301c3cf07b9f133ef546de7befc_key-rootn.jpgtemplate, which is the second function of the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgkey. This template is filled in by using the number and arrow keys (D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a9f0987246ee7951f138e2c03a40c14401ff909f_key-left.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpg) in a way similar to that used when the fraction template is completed.

Start of Activity

**Activity 15 Calculating roots**

Start of Question

Calculate each of the following using your calculator, giving your answer correct to 3 significant figures.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c529b7c8b54b67a61b18180ac16a058cfc3d0a50_img-0103.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3fc8dc5079f24d4385007e4f3bbbfee91148a600_img-0105.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f902bf71d5f507619e691aedb1f9c46d50e0b062_img-0107.jpg
4. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4f4413a076c638b5c08b5410ccac27f628644348_img-0109.jpg

End of Question

[View answer - Activity 15 Calculating roots](" \l "Session6_Answer2)

End of Activity

You will notice from the result of Activity 15, part 4 that the calculator sometimes presents answers using surds.

Start of Box

This is true only if the calculator is in the recommended Math mode.

End of Box

To find the decimal equivalent of an answer like this, you can use the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpgor D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgkeys that you used earlier to find the decimal forms of fractional answers.

## 6.2 Inserting a missing root

Sometimes when entering into your calculator an expression involving roots, you may accidentally forget to press the appropriate function key. However, moving the cursor to the correct point and pressing the missing key, as in section 1, will not work as this simply inserts an empty template.

If you wish to edit an expression to insert a missing root, first move the cursor to the correct place – that is, to the left of the number. Then activate the ‘Insert’ function by pressing D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bac0010ff0f9bda49320e0712fa10cd12571c556_key-del.jpg(INS), and finally press the appropriate root key.

## 7 Trigonometric ratios on your calculator

There are various different units in which an angle can be measured, degrees being one of the possibilities. Before using your calculator to find the values of the trigonometric ratios of angles measured in degrees, you need to ensure that it is set to use the correct units.

Start of Box

Always check that your calculator is using the correct system of angle measurement before using trigonometric ratios.

End of Box

Your calculator is set to use degrees if the display indicator D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5c1e9b9898f2d1616d08e92eb9364a6280d9044e_inverse-d.jpgis shown at the top of the screen. If you see the indicator D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1d69eca39a969e4766bb2d61e9fd58a400206679_inverse-r.jpgor D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_593769f70f17a5386eae04459b0f8515bca8dce7_inverse-g.jpg, then your calculator is set to use different units for measuring angles.

Start of Figure

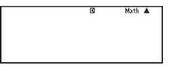


Figure 9 The degrees setting

[View description - Figure 9 The degrees setting](" \l "Session7_Description1)

[View description - Figure 9 The degrees setting](" \l "Session7_Alternative1)

End of Figure

To set your calculator to work in degrees, use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg(Deg).

To calculate the sine, cosine or tangent of an angle, press the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f73d00da119cc1681a70e88a64aebeb51a8e08b4_key-sin.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_20d1b699fa4f6497f5c76527b4ef31f5d191e114_key-cos.jpgor D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f20502dd9304ba70a5dfe4cde8c2ddb4f26da79e_key-tan.jpgkey and then type in the size of the angle. Note that the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f73d00da119cc1681a70e88a64aebeb51a8e08b4_key-sin.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_20d1b699fa4f6497f5c76527b4ef31f5d191e114_key-cos.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f20502dd9304ba70a5dfe4cde8c2ddb4f26da79e_key-tan.jpgkeys automatically open a bracket for you. If you are simply calculating the sine, cosine or tangent of an angle, just press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgafter entering the angle – there is no need to close the bracket. If you are using these ratios as part of a larger calculation, then you will need to remember to close the bracket yourself (by pressing D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5166951880947d5310cdf8e54a629e03e346eb94_key-close.jpg) before entering the remainder of the calculation.

Start of Box

Some older models of calculator require the angle to be input first, followed by the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f73d00da119cc1681a70e88a64aebeb51a8e08b4_key-sin.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_20d1b699fa4f6497f5c76527b4ef31f5d191e114_key-cos.jpgor D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f20502dd9304ba70a5dfe4cde8c2ddb4f26da79e_key-tan.jpgbutton.

End of Box

Start of Activity

**Activity 16 Trigonometric ratios on your calculator**

Start of Question

Calculate the value of each of the following using your calculator, giving your answers correct to 3 significant figures.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4579d6a9eba12e4d9cf7010d38a1cc128a2a4063_img-0111.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e944bbcdc95ec2735f27d17556f728fc1fce6f69_img-0113.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3fd03b7b3f5f2360d6ac045c1612a4ce26bd356a_img-0115.jpg
4. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_b99d08b1c788571f0c7bd20de8053f84f26d5e52_img-0118.jpg
5. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_b28f7eaab89159478231c302628d0c84ee35d043_img-0120.jpg
6. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4e744c45587c91a0a4dc5920631f606aaf82e3a6_img-0124.jpg

End of Question

[View answer - Activity 16 Trigonometric ratios on your calculator](" \l "Session7_Answer1)

End of Activity

You will notice from the answer to part (3) that the calculator displays the ratios of some angles as fractions, involving surds where needed, and not in decimal form.

Start of Box

The decimal form can be found using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgor D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpg.

End of Box

## 8 Finding angles from trigonometric ratios

Inverse trigonometric values can be found using the second functions D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_53289c78c6f788c37cc73687b85775f5caf7f2e1_img-0131.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a36d97b881d37ea7946bbd56f83e49a791482ac1_img-0132.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_abbb9f6cc832e3d0e4c4e600139ae7a40068bd80_img-0133.jpgof the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f73d00da119cc1681a70e88a64aebeb51a8e08b4_key-sin.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_20d1b699fa4f6497f5c76527b4ef31f5d191e114_key-cos.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f20502dd9304ba70a5dfe4cde8c2ddb4f26da79e_key-tan.jpgkeys. These functions are used in a similar manner to D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f73d00da119cc1681a70e88a64aebeb51a8e08b4_key-sin.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_20d1b699fa4f6497f5c76527b4ef31f5d191e114_key-cos.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f20502dd9304ba70a5dfe4cde8c2ddb4f26da79e_key-tan.jpg.

Start of Activity

**Activity 17 Finding angles from trigonometric ratios**

Start of Question

Calculate the value of each of the following expressions using your calculator, where possible, giving your answers correct to 1 decimal place.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_edaf78ab6f02da0bb0346f9a08dc1bb86c1ca318_img-0134.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_b4c9f64b92b9fe23377a67e776def6e9d8fe6e25_img-0137.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ff1372c84feb1228403f17670b254501c628b21e_img-0139.jpg
4. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_22ade42ea5d7dd2ff0d9d604b2a12593ecdf944d_img-0141.jpg

End of Question

[View answer - Activity 17 Finding angles from trigonometric ratios](" \l "Session8_Answer1)

End of Activity

In part (1) of the activity above, you used your calculator to find an angle whose sine is 0.5. This is not the only angle whose sine is 0.5, but you can use this angle to find the other angles. Similar remarks apply to parts (2) and (3).

## 9 Radians on your calculator

Your calculator can be set to calculate trigonometric functions using the radian measure for angles, instead of degrees, by using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6f9d3543c2778855ca12212301982acf426476fa_key-4.jpg(Rad).

When in this mode, the display indicator D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1d69eca39a969e4766bb2d61e9fd58a400206679_inverse-r.jpgis shown.

Start of Activity

**Activity 18 Radians on your calculator**

Start of Question

In this activity, the angles are measured in radians. Find the values of the following expressions, giving your answers correct to 3 significant figures.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_93edcc9bf70bfc91ef5befeeeb2dfda7e446cf06_img-0142.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d7582c5f8ed76c594d49d0c858c1afa9ca6e7ef0_img-0144.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a89951be37850ecda6fb090f450c7d7b1f172d1a_img-0146.jpg

End of Question

[View answer - Activity 18 Radians on your calculator](" \l "Session9_Answer1)

End of Activity

Notice from the final example in this activity that where an answer is a simple (possibly fractional) multiple of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpg, the answer is displayed in terms of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpgrather than as a decimal number.

## 10 Logarithms on your calculator

Logarithms to base 10 of numbers can be found using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_681f3f770a58fc1370d96e7df13d899ef87133e0_key-log.jpgkey. For example, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_657c259ddf5b06cdd9d26bfcdb9629170d8bfa19_img-0148.jpgcan be calculated using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_681f3f770a58fc1370d96e7df13d899ef87133e0_key-log.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_06c2925d159ad5bee96af6350370e37617e1ce30_key-0.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_06c2925d159ad5bee96af6350370e37617e1ce30_key-0.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg. Note that as with the trigonometric functions, the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_681f3f770a58fc1370d96e7df13d899ef87133e0_key-log.jpgkey automatically opens a bracket that must be closed if you are using the calculated logarithm as part of a longer calculation.

Start of Box

The second function of the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_681f3f770a58fc1370d96e7df13d899ef87133e0_key-log.jpgkey D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bd46e735fde7b912fddd3ff8c60fe1e8b96039a6_key-10x.jpg, accessed using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_681f3f770a58fc1370d96e7df13d899ef87133e0_key-log.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bd46e735fde7b912fddd3ff8c60fe1e8b96039a6_key-10x.jpg, can be used as an alternative to D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgwhen calculating powers of 10.

End of Box

Start of Activity

**Activity 19 Calculating logarithms**

Start of Question

Use your calculator to find the values of the following.

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f6e5b2cbe1b2b6e47e8fbad46458e0fa0d7c3387_img-0149.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5e85c03e17929eef372d0eae3b1d1eb663d949e1_img-0151.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c88a97b7b53bad093e3804082ed45e1a3fe7ef5f_img-0153.jpg(1 billion) , D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_55c30f045d7239edd03796d4332380fb368dd5d3_img-0155.jpg

End of Question

[View answer - Activity 19 Calculating logarithms](" \l "Session10_Answer1)

End of Activity

## 11 Natural logarithms and powers of e on your calculator

Natural logarithms, for example D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_39d68411fddd97c5c1793da82183c07a6baa672c_img-0157.jpg, can be evaluated on your calculator using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e7605f8e2bfeeb4475013b808258fd34d9dfac0e_key-ln.jpgkey. The second function of this key  (D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e7605f8e2bfeeb4475013b808258fd34d9dfac0e_key-ln.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d80765c8608054229ed730ee0d94340af7177d05_key-ex.jpg) permits the calculation of powers of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ff1dd5a5d1feb4de5253e583c9fe5a385acbf3b6_img-0158.jpg. Note that an approximate value for D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ff1dd5a5d1feb4de5253e583c9fe5a385acbf3b6_img-0158.jpgitself can be obtained using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aaf4afe981155a9c3ea57ed36b35e24403fc4d00_key-alpha.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_662f03223cc6a43392ef3d83e4ec960a2964c41d_key-x10x.jpg(D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ff1dd5a5d1feb4de5253e583c9fe5a385acbf3b6_img-0158.jpg).

Start of Box

Remember that D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_424cf79b7c4a5aeaefec392a12db2a4c46d15330_img-0159.jpgmeans the same as ln. Some calculators have a D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_164a300ec49b6ad3b22253fca4ad0b87c9eb282b_key-logn.jpgkey instead of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e7605f8e2bfeeb4475013b808258fd34d9dfac0e_key-ln.jpg.

End of Box

Start of Activity

**Activity 20 Calculating natural logarithms and powers of e**

Start of Question

Calculate the value of each of the following using your calculator, giving each answer to 3 significant figures.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_39d68411fddd97c5c1793da82183c07a6baa672c_img-0157.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51e824605364a9beb21cf3bc9f6a6092aadf5775_img-0162.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_384a15bc60b58bb02e8f7aa8927579ce14f0411f_img-0164.jpg
4. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4ef54d2107a69a747298d1bc7117500e2a016768_img-0169.jpg
5. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a69d12561ce9e82d0a82f89a9f5a56882e8ab716_img-0171.jpg

End of Question

[View answer - Activity 20 Calculating natural logarithms and powers of e](" \l "Session11_Answer1)

End of Activity

## 12 Calculator reference guide

## Calculator modes

## General modes

The calculator can operate in several different modes:

* COMP, which is used for general calculations
* STAT, which is used for statistical calculations
* TABLE, which is used for generating tables of numbers.

Start of Box

COMP is short for ‘computation’, and STAT is short for ‘statistics’.

End of Box

Comp mode is selected by using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpg(COMP).

## Mathematics modes

There are two different ways in which mathematics can be input to and displayed on the calculator:

* Math mode, in which fractions are entered and displayed in their proper mathematical form – for example, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d7359949dc954d3cf61238d3e42c2365734379d1_img-0173.jpg– and some irrational numbers are displayed as surds (such as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_b7e3d6768db28998fe54f26086e34caf5b617158_img-0102.jpg) or multiples of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpg(such as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c1cf020c3c4ae0ca36d7bf4d9e2b92eec9b51926_img-0174.jpg).

Math mode is selected by using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpg(MthIO).

* Linear mode, in which fractions such as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d7359949dc954d3cf61238d3e42c2365734379d1_img-0173.jpgare entered and displayed using a linear notation – for example, 2 D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7e755819e35af1c2c37a6c3d8da8d738b131d4ec_tetris.jpg3 – and all irrational numbers (such as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_b7e3d6768db28998fe54f26086e34caf5b617158_img-0102.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c1cf020c3c4ae0ca36d7bf4d9e2b92eec9b51926_img-0174.jpg) are displayed as decimal approximations.

Linear mode is selected by using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg(LineIO).

Start of Box

Put simply, an irrational number is one that cannot be expressed as a simple fraction.

End of Box

You know that you are in Math mode if the word Math is shown near the right-hand side of the top of the calculator display. If this is not shown, you are using Linear mode.

In Math mode, you can force an answer to be displayed as a decimal using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg, or you can toggle between the mathematical and decimal outputs using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpg.

## Fraction display modes

It is possible to set the calculator so that answers that are top-heavy fractions (such as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ddcf3ef7fdd4b0a9fc7acdbd50cf591db35cfcbc_img-0175.jpg) are always displayed as mixed numbers (such as D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d3220edf26e541c459e0bcc7394b944c2d193b85_img-0044.jpg).

* To set the calculator to display as mixed numbers, use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpg(ab/c).
* To set the calculator to display as top-heavy fractions, use the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg(d/c).

## Decimal display modes

The calculator can be set to display decimal numbers in various different ways:

* Normal 1 (Norm 1) mode uses scientific notation for any number less than 0.01 but greater than −0.01, and otherwise displays answers to however decimal places they have, subject to the maximum that will fit on the display. This mode is entered using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bb0876d13b59b612b82868ef4bc57748de86f774_key-8.jpg(Norm)D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpg.
* Normal 2 (Norm 2) mode uses scientific notation for any number less than 0.000000001 but greater than −0.000000001, but otherwise displays answers to however many decimal places they have, subject to the maximum that will fit on the display. This mode is entered using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bb0876d13b59b612b82868ef4bc57748de86f774_key-8.jpg(Norm)D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg.
* Scientific notation mode (Sci) displays all decimal numbers in scientific notation using a specified number of significant figures. This mode is entered using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_634d7962d2548a77512edd656f053c3b3b82d843_key-7.jpg(Sci) followed by the number of significant figures required, for example D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg. When your calculator is set in this mode, the display indicator SCI is shown.
* Fixed decimal place mode (Fix) displays all decimal numbers to a given number of decimal places (unless scientific notation is needed to fit the result on the display). This mode is entered using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2324031796fdd05882a4b5eed7b01b99772ef473_key-6.jpg(Fix) followed by the number of decimal places required, for example D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg. When your calculator is set in this mode, the display indicator FIX is shown.

## 12.1 Display indicators

These are symbols shown on the calculator display to indicate its current state of operation.

Start of Table

|  |  |
| --- | --- |
| **Symbol on display** | **Meaning** |
| D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_61a7156992253eff4438e39b1355b94aa83eab67_inverse-s.jpg | The D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgkey has been pressed. |
| D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ac7ea5e1eeb6da87f5f8225723380b964b80bec2_inverse-a.jpg | The D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aaf4afe981155a9c3ea57ed36b35e24403fc4d00_key-alpha.jpgkey has been pressed. |
| M | A value is stored in the ‘M’ memory. |
| STO | The STORE key (D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(STO)) has been pressed. |
| RCL | The RECALL (D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg) key has been pressed. |
| D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5c1e9b9898f2d1616d08e92eb9364a6280d9044e_inverse-d.jpg | The calculator is set to measure angles in degrees. |
| D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1d69eca39a969e4766bb2d61e9fd58a400206679_inverse-r.jpg | The calculator is set to measure angles in radians. |
| D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_593769f70f17a5386eae04459b0f8515bca8dce7_inverse-g.jpg | The calculator is set to measure angles in gradians. |
| FIX | The calculator is set to display answers to a fixed number of decimal places. |
| SCI | The calculator is set to display answers in scientific notation with a fixed number of significant figures. |
| Math | The calculator is set to use Math mode for input and display. |
| STAT | The calculator is in statistics mode. |
| D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_72e0b007a5fbbdf9c0717ccafc4893e44ad65d96_img-0176.jpg | There is more information available than can be displayed, and this can be accessed using the up/down cursor keys. |
| D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_65c791f5eba778297870baff1128086a9c7f56d7_img-0177.jpg | The line displayed is longer than can fit on the display. Other parts of the line can be displayed by scrolling using the left/right cursor keys: D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a9f0987246ee7951f138e2c03a40c14401ff909f_key-left.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpg. |

End of Table

## 12.2 Common operations

Start of Table

|  |  |
| --- | --- |
| **To** | **Key sequence** |
| Turn on | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_110d05de91c067239039ed76b21b60428a33401d_key-on.jpg |
| Turn off | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpg(OFF)  Note that the calculator will automatically turn off if not used for about 6 minutes. |
| Adjust the display contrast | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_af12d54b4fec73d8d2a9a64f8fda3dc2bc9d06fc_key-5.jpg(◄CONT►) then use D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a9f0987246ee7951f138e2c03a40c14401ff909f_key-left.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpgto adjust, and press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpgwhen finished. |
| Restore the factory settings | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9af3914e032e2a4e3dbf7386b6fe513c9522b08f_key-9.jpg(CLR) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpg(Setup) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg(Yes) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpg |
| Clear the contents of all memories | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9af3914e032e2a4e3dbf7386b6fe513c9522b08f_key-9.jpg(CLR) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg(Memory) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg(Yes) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpg |
| Restore the default settings and clear all memories | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9af3914e032e2a4e3dbf7386b6fe513c9522b08f_key-9.jpg(CLR) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg(All) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg(Yes) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpg |
| Cancel a calculation, or exit menus | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9436a342ed338c66b2ab97a695ae8eb214e3c016_key-ac.jpg |
| Obtain an answer | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg |
| Obtain a decimal answer in Math mode | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg |
| Toggle between exact and decimal answers in Math mode | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpg |
| Toggle between displaying fractions as improper fractions or mixed numbers in Math mode | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_25991213f3a7daf91ca96cf79710cb3434de5b1a_key-abc-dc.jpg |
| Use the result of the previous calculation… | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c644a33df58f7bb6a005b4065e19b11c67ece4d9_key-ans.jpg |
| … e.g. to find 42 minus the previous result | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6f9d3543c2778855ca12212301982acf426476fa_key-4.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4ab5fa6b01a08f5e9aaac41df0c1e527a179f0fd_key--.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c644a33df58f7bb6a005b4065e19b11c67ece4d9_key-ans.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg |
| Store a value in ‘M’ memory | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(STO) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M) |
| Clear a value stored in the M memory | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_06c2925d159ad5bee96af6350370e37617e1ce30_key-0.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(STO) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M) |
| Add a value to that in the ‘M’ memory | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg |
| Subtract a value from that in the ‘M’ memory | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M-) |
| Display the value stored in the ‘M’ memory | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M) |
| Use the value in the ‘M’ memory in a calculation… | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aaf4afe981155a9c3ea57ed36b35e24403fc4d00_key-alpha.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg |
| … e.g. to find 42 minus the value in the ‘M’ memory | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6f9d3543c2778855ca12212301982acf426476fa_key-4.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4ab5fa6b01a08f5e9aaac41df0c1e527a179f0fd_key--.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aaf4afe981155a9c3ea57ed36b35e24403fc4d00_key-alpha.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg |
| Set angles to be measured in degrees | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg(Deg) |
| Set angles to be measured in radians | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6f9d3543c2778855ca12212301982acf426476fa_key-4.jpg(Rad) |
| Set answers to be displayed to 3 decimal places (To use a different number of decimal places, replace D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgwith that number) | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2324031796fdd05882a4b5eed7b01b99772ef473_key-6.jpg(Fix) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg |
| Set answers to be displayed in scientific notation with 3 significant figures (To use a different number of significant figures, replace D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgwith that number) | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_634d7962d2548a77512edd656f053c3b3b82d843_key-7.jpg(Sci) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg |
| Cancel any display rounding settings | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bb0876d13b59b612b82868ef4bc57748de86f774_key-8.jpg(Norm) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg |

End of Table

Start of Box

The A, B, C, D, X, Y memories are used similarly to the M memory, except that these have no ‘add to’ and ‘subtract from’ functions.

End of Box

## 12.3 Entering mathematics

Start of Table

|  |  |
| --- | --- |
| **To enter** | **Key sequence** |
| D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4b46f3264f2e4b02035037a0865d8d6bb1d81aeb_img-0029.jpg | D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_166e4831767cbacecf63fa701dbfb8046359a705_key-neg.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgor D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4ab5fa6b01a08f5e9aaac41df0c1e527a179f0fd_key--.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpg |
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D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ff1dd5a5d1feb4de5253e583c9fe5a385acbf3b6_img-0158.jpgare mathematical constants.

When using trigonometric functions, ensure that your calculator is set to use the correct units: degrees or radians.

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_174b63c8f86416c104fe1462c06cdea8c2e2a44f_img-0188.jpgand D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5679651d212e2e94e8d4ce85383a258e4ec8ad39_img-0189.jpgare calculated in a similar way to D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_edaf78ab6f02da0bb0346f9a08dc1bb86c1ca318_img-0134.jpg.

End of Box

## Conclusion

This free course provided an introduction to studying Mathematics and Statistics. It took you through a series of exercises designed to develop your approach to study and learning at a distance and helped to improve your confidence as an independent learner.

## Keep on learning

Start of Figure

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d3c986e615af52d98ee2159f5114e2c4bec9ff99_ol_skeleton_keeponlearning_image.jpg

End of Figure

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Access Courses – [www.open.ac.uk/courses/do-it/access](http://www.open.ac.uk/courses/do-it/access?utm_source=openlearn&utm_campaign=ol&utm_medium=ebook)

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End of Box

## Acknowledgements

Grateful acknowledgement is made to the following:

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Figure 1: © Casio Electronics Co Ltd.

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## Solutions

## Activity 2 Sums, differences, products and quotients

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_53ca24d742830f7f412883dbbc4feb809f91e2d6_img-0002.jpg

Note that the calculator uses the **BIDMAS** rules. These say that any expression within **B**rackets should be calculated first, then any **I**ndices (often called powers), followed by **D**ivisions and **M**ultiplications and finally **A**dditions and **S**ubtractions.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5ba15e603d53cfe0d48ad56e4eef781fd24df98d_img-0004.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_912169c221ef486e25aeaed4230dbda04765e599_img-0006.jpg

To calculate this correctly you need to remember to insert the brackets into the calculation using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_52eb3db5b65acaf2a32886722b903f76373e4f28_key-open.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5166951880947d5310cdf8e54a629e03e346eb94_key-close.jpgkeys.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7465356310b7a144f2c62d4f18676ff71829a591_img-0008.jpg

[Back to - Activity 2 Sums, differences, products and quotients](" \l "Session1_Activity2)

## Activity 3 Fractions and decimals

#### Answer

In Math mode, calculating D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0e9796599de0c71af5afbb32346b89b0eedfa53f_img-0013.jpggives the result D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2a12a24e316d40a4016f85d7b5f2a37cfa614c63_img-0014.jpg.

Converting this to a decimal using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpggives 0.1814671815.

[Back to - Activity 3 Fractions and decimals](" \l "Session1_Activity3)

## Activity 4 Calculating powers

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_358bab53b79069b48b8d7a65735dd92cd5b2bdd6_img-0019.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fd4a8b4424e9640000ef09adb235193d5b2f546f_img-0021.jpg

Here you need to use the general power key D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpg.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1415829e9e015471f36574b33b18522c78d9f43d_img-0023.jpg

Remember to use the right arrow key D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpgafter inputting the power 8 to move out of the power position before entering the rest of the expression. If you obtained the answer 2243822356, you have calculated D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6ef7724b42075f7a4a3cabde7b8f8ae853244dc2_img-0024.jpgby mistake.

[Back to - Activity 4 Calculating powers](" \l "Session1_Activity4)

## Activity 5 Making corrections

#### Answer

The correct value of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c935089159d9efcaa3fab6678435a8fda714126f_img-0025.jpgis 16. The key sequence given did not close the bracket before squaring the expression, so only the 3 was squared, giving D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2a5b476b5d633773df344d19c7eb4b1022b3553f_img-0026.jpg.

When correcting the expression, be careful to ensure that the cursor is immediately after the 3, and the same height as it – shown below – before inserting the missing bracket. Otherwise, the bracket may be inserted within the power.

Start of Box

Start of Figure

The figure shows the display on a calculator screen of the cursor, placed after the 3.

Figure 7 The cursor, placed after the 3

[View description - Figure 7 The cursor, placed after the 3](" \l "Session1_Description7)

[View description - Figure 7 The cursor, placed after the 3](" \l "Session1_Alternative7)

End of Figure

End of Box

[Back to - Activity 5 Making corrections](" \l "Session1_Activity5)

## Activity 6 Subtraction and negative numbers

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ccdb2645fdb5c59e5f96821b374662a1f78c2c05_img-0031.jpg

Remember to press D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgto obtain a decimal answer.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e701ceaa3892889ff751660209dc5f533c3db651_img-0033.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_43227cb216e78b2488196c413bce6d1d847f51ad_img-0035.jpg
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_59ad43904100cd5f907a6969792d2c96bf2ee9fd_img-0037.jpg
4. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f2c18e8683b20ca33c3815289674757ce5cbfc5c_img-0039.jpg

[Back to - Activity 6 Subtraction and negative numbers](" \l "Session2_Activity1)

## Activity 7 Fractions

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_38ba41887600588c01b3bb07d15983eae22feb7e_img-0046.jpg
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_906cbba378a1fb4852a53c04693602c6397d4539_img-0047.jpgof 190 can be written D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c2a03de7a6a734fedfa00f6cdb42f713eda8c806_img-0048.jpg, which is equal to D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_503b4e69134393c91355aeab20de6b1d7db3f8d3_img-0049.jpgor 71.25.

The decimal answer can be obtained by using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpg.

Remember to use the cursor right key D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpgto move the cursor out of the denominator of the fraction before entering the multiplication sign. If you obtained the answer D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_94aebd1c0a3a955410e6364297cad120b5359e21_img-0050.jpg, you calculated D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b2732c270df56f98f102f1539d7e91da7446dbd_img-0051.jpgby mistake.

[Back to - Activity 7 Fractions](" \l "Session3_Activity1)

## Activity 8 Mixed numbers

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_69f87cb5a488a527f1532e687d81be7052f6d8bc_img-0052.jpg

Remember to use D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe0037dfec63bbfe0fb6728f02393a44dd2ea176_key-s-d.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_25991213f3a7daf91ca96cf79710cb3434de5b1a_key-abc-dc.jpgto toggle between the top-heavy fraction and mixed number answers.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dda35f40252ed8749f37dc95796835ddcd79ab3e_img-0054.jpg

Remember to use the template obtained using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_27d0e825110cc5356eb38d8cda4c5598770b580f_key-frac.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5e52f21e54014ee492c0387cea2a3509f15fcf74_key-frac2.jpgand to use the cursor arrow keys to move between the boxes when inputting the mixed number.

[Back to - Activity 8 Mixed numbers](" \l "Session3_Activity2)

## Activity 9 Using the fraction key

#### Answer

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0df2ae74906e4b468849d79ba9f819b40b6ff037_img-0063.jpg(to 3 significant figures).

The key sequence used was D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_27d0e825110cc5356eb38d8cda4c5598770b580f_key-frac.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ad8fb9e28f2be6ac10fd0ad53f1697fce36c49f3_key-point.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_af12d54b4fec73d8d2a9a64f8fda3dc2bc9d06fc_key-5.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1e37ae26af154b954604add465a53a52d4a032e5_key-times.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_06c2925d159ad5bee96af6350370e37617e1ce30_key-0.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ad8fb9e28f2be6ac10fd0ad53f1697fce36c49f3_key-point.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9af3914e032e2a4e3dbf7386b6fe513c9522b08f_key-9.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7f9deb4302c6e12564d6c269b6e57c4e0b630e4a_key-x2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6f9d3543c2778855ca12212301982acf426476fa_key-4.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1e37ae26af154b954604add465a53a52d4a032e5_key-times.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_662f03223cc6a43392ef3d83e4ec960a2964c41d_key-x10x.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2e5da5bbacd735b382f9da452646e7cc37955670_key-pi.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg.

Note that it is not strictly necessary to include the multiplication between the 4 and the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpgin the denominator since if the sign is omitted, it will be assumed by the calculator.

[Back to - Activity 9 Using the fraction key](" \l "Session4_Activity1)

## Activity 10 Using the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_237f01f7152527615c5beec3ca139f2e332bc05b_key-div.jpgkey

#### Answer

Typing D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8ff3038b9a775d5f02722741c2c323c037785b33_img-0065.jpginto the calculator and pressing D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgwill not give the correct answer because the calculator will follow the BIDMAS rules and divide D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9cf7f663f25b9b5879a554b63a31aef60ebea898_img-0068.jpgby 4 and then multiply by D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpg, instead of dividing by D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9da3561074e4da08415646be261e5891e86aa11f_img-0069.jpg.

To obtain the correct result, you have to type D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_11ab6074e2c665b19841de69f8bb8b8adb714f0c_img-0070.jpg. (Alternatively, you can type D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f669136a39e7f7ef8c7e21dfd6c3e8860725d1d4_img-0071.jpg.)

(Note that on some later models of the calculator, the correct answer is obtained without adding the brackets to the denominator; however it is good practice to add the brackets to ensure the correct calculation is carried out).

[Back to - Activity 10 Using the key](" \l "Session4_Activity2)

## Activity 11 Bottom first!

#### Answer

The value of the denominator is 12.566…, and the final answer is 0.101 to 3 significant figures.

[Back to - Activity 11 Bottom first!](" \l "Session4_Activity3)

## Activity 12 Using memory

#### Answer

The value of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2f3295d0d1e90c9d46d2a94220c6946e95477227_img-0077.jpg(which equals 0.0796 to 3 significant figures) can be calculated using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_27d0e825110cc5356eb38d8cda4c5598770b580f_key-frac.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6f9d3543c2778855ca12212301982acf426476fa_key-4.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_662f03223cc6a43392ef3d83e4ec960a2964c41d_key-x10x.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2e5da5bbacd735b382f9da452646e7cc37955670_key-pi.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgand stored in the ‘M’ memory using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_0309ede4d996612ef8c85f680e445ce36f8f4649_key-rcl.jpg(STO) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M).

This value can then be used to find the final result using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ad8fb9e28f2be6ac10fd0ad53f1697fce36c49f3_key-point.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_af12d54b4fec73d8d2a9a64f8fda3dc2bc9d06fc_key-5.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1e37ae26af154b954604add465a53a52d4a032e5_key-times.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_06c2925d159ad5bee96af6350370e37617e1ce30_key-0.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ad8fb9e28f2be6ac10fd0ad53f1697fce36c49f3_key-point.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9af3914e032e2a4e3dbf7386b6fe513c9522b08f_key-9.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7f9deb4302c6e12564d6c269b6e57c4e0b630e4a_key-x2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1e37ae26af154b954604add465a53a52d4a032e5_key-times.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aaf4afe981155a9c3ea57ed36b35e24403fc4d00_key-alpha.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8b1549f99e16eb2d80bea983db34e4e09e7b8f69_key-mplus.jpg(M) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg, which gives 0.101 to 3 significant figures, as expected.

[Back to - Activity 12 Using memory](" \l "Session4_Activity4)

## Activity 13 Calculating with scientific notation

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a9cbd7f138b920308386ca7da6ff676712720c32_img-0091.jpgor 85570
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_127e91d5082a37288a7bfa17341d829080b296f6_img-0093.jpgor 0.129258
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3ee0a44f6dc32f1bb8c8c2729d98ed35e4b35c32_img-0095.jpgor 2343750

[Back to - Activity 13 Calculating with scientific notation](" \l "Session5_Activity1)

## Activity 14 Calculating more powers

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_097cdf998eed0dacbd5b84c939d47cb68d00ab83_img-0097.jpg(to 3 significant figures) using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9af3914e032e2a4e3dbf7386b6fe513c9522b08f_key-9.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_27d0e825110cc5356eb38d8cda4c5598770b580f_key-frac.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg.
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2d11dc4ec7c02b6c57d244b9ea46ffb1757516a9_img-0099.jpg(to 3 significant figures) using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_27d0e825110cc5356eb38d8cda4c5598770b580f_key-frac.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3f2d5338b8100a51f655638a783c00f87fff74fa_key-down.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2324031796fdd05882a4b5eed7b01b99772ef473_key-6.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg.
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd77025ecec25f07e1d144c43d60391043a7e80e_img-0101.jpg(to 3 significant figures) using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ad8fb9e28f2be6ac10fd0ad53f1697fce36c49f3_key-point.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_6f9d3543c2778855ca12212301982acf426476fa_key-4.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_166e4831767cbacecf63fa701dbfb8046359a705_key-neg.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ad8fb9e28f2be6ac10fd0ad53f1697fce36c49f3_key-point.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg.

[Back to - Activity 14 Calculating more powers](" \l "Session6_Activity1)

## Activity 15 Calculating roots

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_900e8fb6f9e07397fd8fec3b110b2bdcfcc81f8f_img-0104.jpg(to 3 significant figures) using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ee71732e6209545c781c413ea079b68dc26447bf_key-sqrt.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_af12d54b4fec73d8d2a9a64f8fda3dc2bc9d06fc_key-5.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bb0876d13b59b612b82868ef4bc57748de86f774_key-8.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg.
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_65005062b53b9d52c6defb7e38ee4441e4be5f83_img-0106.jpg(to 3 significant figures) using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ee71732e6209545c781c413ea079b68dc26447bf_key-sqrt.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e5d2ec5b1b4db2bc402bf9ab193bb138f3987473_key-root3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_af12d54b4fec73d8d2a9a64f8fda3dc2bc9d06fc_key-5.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2324031796fdd05882a4b5eed7b01b99772ef473_key-6.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg.
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ce67bd8d7065150b091c103839d156490c36e50c_img-0108.jpg(to 3 significant figures) using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2c7fa9ce7ed22e073aafe6923b6d991de97daa3d_key-xn.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1b6476a45882d301c3cf07b9f133ef546de7befc_key-rootn.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2324031796fdd05882a4b5eed7b01b99772ef473_key-6.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_dd613e0a6c9612bd99d6d4136d3e89e006956770_key-right.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51ef95d36323fdbd0cb8714cd644fdb55ae9b329_key-2.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e1925ffb28a689f44b130fdbb44080b0be510a7c_key-1.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_634d7962d2548a77512edd656f053c3b3b82d843_key-7.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg.
4. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ea5455a1e9615ef2c87de12afa36c884eaeacf41_img-0110.jpgor 18.4 (to 3 significant figures) using the key sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ee71732e6209545c781c413ea079b68dc26447bf_key-sqrt.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bb0876d13b59b612b82868ef4bc57748de86f774_key-8.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpg(and using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_fe1760f797f60ff8e4b64459f142ae0b596814ea_key-equals.jpgto find the decimal result).

[Back to - Activity 15 Calculating roots](" \l "Session6_Activity2)

## Activity 16 Trigonometric ratios on your calculator

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_93f020d15ec4d46f9383feb0cf53fb54e3c84865_img-0112.jpg(to 3 significant figures). If you got 0.657, then your calculator is currently set to calculate in radians, so reset it to work in degrees using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_e38a0c82dd8c6b80f5bb3468bf0c771cb60f0d23_key-mode.jpg(SETUP) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a5d8dece732bcdcc87d30f7262e276062fe0f1d8_key-3.jpg(Deg).
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_bdb61423591cab2671f763b28c38e22b055792af_img-0114.jpg(to 3 significant figures).
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_579ef8eec29c9f628b4a2a0009416c75d6b43c7e_img-0116.jpgor D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_8d435533c140b324661802d6271c3e70011438ee_img-0117.jpgor 0.707 (to 3 significant figures).
4. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5706a3ca4484afed242a90610a2e3886e6bd1123_img-0119.jpg(to 3 significant figures).
5. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_ccce619318823cc68efa53073566525f24766319_img-0121.jpg(to 3 significant figures).

Remember to close the bracket that pressing D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f73d00da119cc1681a70e88a64aebeb51a8e08b4_key-sin.jpgopens before entering the ‘+5’. If you obtained the answer 0.845 (to 3 significant figures), you probably calculated D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_572eace5d1e3b61285d0bfc1206fd3b25da272d6_img-0122.jpginstead.

Note that when entering this expression in your calculator, it is possible to omit explicitly entering the multiplication between the 2 and D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5d141cf4ab1f60f89851d31c2730c180d322ebc6_img-0123.jpgsince the calculator will assume it.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1bdb670b4ae177aa711deb02de96f6d37ea2fbb6_img-0125.jpg.

Note that D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_746cd756f2442f231ca5ed2b7b608fac0e94ab8e_img-0126.jpgmeans first find the sine of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_4008f030c13f6ee9b9cd213fed22bb865cdbeb48_img-0127.jpg, then square the answer. The key sequence to enter D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_746cd756f2442f231ca5ed2b7b608fac0e94ab8e_img-0126.jpginto the calculator is thus D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_52eb3db5b65acaf2a32886722b903f76373e4f28_key-open.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f73d00da119cc1681a70e88a64aebeb51a8e08b4_key-sin.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_af12d54b4fec73d8d2a9a64f8fda3dc2bc9d06fc_key-5.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2324031796fdd05882a4b5eed7b01b99772ef473_key-6.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5166951880947d5310cdf8e54a629e03e346eb94_key-close.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5166951880947d5310cdf8e54a629e03e346eb94_key-close.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7f9deb4302c6e12564d6c269b6e57c4e0b630e4a_key-x2.jpg. The first D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5166951880947d5310cdf8e54a629e03e346eb94_key-close.jpgis necessary to close the bracket automatically opened when pressing D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f73d00da119cc1681a70e88a64aebeb51a8e08b4_key-sin.jpg, and the second closes the bracket opened at the start of the sequence. Since the calculator evaluates the sine as soon as it encounters the first closing bracket, it is possible to enter this expression using the alternative sequence D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f73d00da119cc1681a70e88a64aebeb51a8e08b4_key-sin.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_af12d54b4fec73d8d2a9a64f8fda3dc2bc9d06fc_key-5.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2324031796fdd05882a4b5eed7b01b99772ef473_key-6.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5166951880947d5310cdf8e54a629e03e346eb94_key-close.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7f9deb4302c6e12564d6c269b6e57c4e0b630e4a_key-x2.jpg, but this is not recommended as the former is more clear.

It is a property of trigonometric ratios that for any angle D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_147dc118f0e2acf8b4781065251302e5d96c0700_img-0129.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_aa517afcabd51319822ece60a7cd1459c1154caf_img-0130.jpg.

[Back to - Activity 16 Trigonometric ratios on your calculator](" \l "Session7_Activity1)

## Activity 17 Finding angles from trigonometric ratios

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_9a59cfe64be98c7c0b7b6c26a7ffeea62de833b7_img-0135.jpg.

If you obtained the answer D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_90eb9ab0dbc36f3e827b3f9d77459207d7a4c4d6_img-0136.jpgor 0.5236 (to 4 decimal places), then your calculator is set to work in radians. Make sure that you are working in degrees.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2f4e3bca27fec9a4ebaaeabb15acfb865e564702_img-0138.jpg(to 1 decimal place).
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2b14b1bea63edcdc8743c12eca8adc4ddceba030_img-0140.jpg(to 1 decimal place).
3. The calculation D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_22ade42ea5d7dd2ff0d9d604b2a12593ecdf944d_img-0141.jpgis not possible, and your calculator will give a ‘Math Error’. There is no angle whose sine is 2, because the hypotenuse is always the largest side of a right-angled triangle, and hence the maximum value the sine of an angle can be is 1.

[Back to - Activity 17 Finding angles from trigonometric ratios](" \l "Session8_Activity1)

## Activity 18 Radians on your calculator

#### Answer

Remember to set your calculator to work in radians before entering these calculations.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d79d2749ca4e9615af26f9fbabd9d1a417ae29a6_img-0143.jpg(to 3 significant figures).
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_d1def7a908eef354abab91fa6b0641fa60835aee_img-0145.jpg.

Remember: D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_76b4f12c1ee31dcf0867267de7d75342f5e323ea_img-0061.jpgcan be input to the calculator using D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_86f71ff82941ee8d55d265e2bcf8a9a4e6c72233_key-shift.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_662f03223cc6a43392ef3d83e4ec960a2964c41d_key-x10x.jpgD:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_2e5da5bbacd735b382f9da452646e7cc37955670_key-pi.jpg.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_f34b5da40c41dcc5d94baaf8ec5ff8d4b0110313_img-0147.jpgor 0.785 (to 3 significant figures).

[Back to - Activity 18 Radians on your calculator](" \l "Session9_Activity1)

## Activity 19 Calculating logarithms

#### Answer

All the calculations are logarithms to base 10, so we use the D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_681f3f770a58fc1370d96e7df13d899ef87133e0_key-log.jpgkey.

D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_b16f4bf9ca6ce6b934ee223835d8d6765313a1e2_img-0150.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_a7bb44c94f9445de85549838ff6e6089d94909e8_img-0152.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_c88a97b7b53bad093e3804082ed45e1a3fe7ef5f_img-0153.jpg(1 billion) D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3fec026d9d064455187e9bafb63d84a77c18ae3c_img-0154.jpg, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_720dd48ede50f2ae125fca62648bfa3a7446f426_img-0156.jpg.

[Back to - Activity 19 Calculating logarithms](" \l "Session10_Activity1)

## Activity 20 Calculating natural logarithms and powers of e

#### Answer

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_871b542cb432934056153d44a60a756dbb14e711_img-0161.jpg(to 3 significant figures).
2. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_3a9a1e078c4cf0284606ad44fa92c5d909fda9b0_img-0163.jpg(to 3 significant figures).
3. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_b931ad0851960816a453448fd515f4478c07521d_img-0165.jpg(to 3 significant figures).

Notice that this is about three times the answer to part (2). In fact, the exact value of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_384a15bc60b58bb02e8f7aa8927579ce14f0411f_img-0164.jpgis precisely three times the exact value of D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_51e824605364a9beb21cf3bc9f6a6092aadf5775_img-0162.jpg. This is because D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_5739f768240ba0310f94bad4c06b4b03eedaabd9_img-0166.jpg, and for any base of logarithm, D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_7cc1367a2922128696301f009e9780bbfb7e74eb_img-0167.jpg. This is an important result for logarithms. In this case we have D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_571802692c37268eb932609ec0a91df375199bdc_img-0168.jpg.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_1dd8411c37cf064511352524b4bd26841e94e07b_img-0170.jpg(to 3 significant figures).

To calculate this answer correctly, you need to remember to close the bracket after the 3 on your calculator display.

1. D:\AaaF\OUT\httpswwwopeneduopenlearnocw_cmid4256_2021-12-10_11-44-43_nsfr2\word\assets\_164bc5797879b4843afdcbee5f6754fa7ec6bc6d_img-0172.jpg(to 3 significant figures).

[Back to - Activity 20 Calculating natural logarithms and powers of e](" \l "Session11_Activity1)

# Figure 1 A typical scientific calculator

## Description

The figure shows a photograph of a Casio scientific calculator f x - 83 E S (natural display) with annotations added to explain some of the features. The calculator screen at the top, annotated with ‘display’, has three rows. The top row of the screen contains the letter D (white text on black) in the centre, and the word ‘math’ with an upward pointing arrowhead towards the right end. The middle row of the screen has the mathematical text square root 12 multiplied by square root 6 multiplied by square root 3 all over 2 at the left-hand side. The bottom row has the mathematical text 3 square root 6 at the right-hand side. Beneath the display is a row of five blue buttons annotated, from left to right: ‘shift key’; ‘alpha key’; ‘cursor control button’ (this button is much larger and in the centre); ‘mode key’; ‘on key’. Below these are four rows of black buttons (twenty two buttons in total) with the annotation ‘function keys’. At the bottom left of the calculator an array of twelve buttons is annotated with ‘number keys’. To the right of these the red button labelled D E L (written as one word) is annotated with ‘delete key’ and the red button labelled A C (written as one word) is annotated with ‘all clear key’. Below these the multiply, divide, add, subtract keys are annotated with ‘basic operation keys’. Below these the button labelled Ans is annotated with ‘last answer key’ and the button labelled = is annotated with ‘equals key’.

[Back to - Figure 1 A typical scientific calculator](" \l "Session1_Figure1)

# Figure 2 The calculator display

## Description

The figure shows the display on a calculator screen with annotations added to explain some of the features. The top row of the screen contains the letter D (white text on black) in the centre, and the word ‘math’ with an upward pointing arrowhead towards the right end, and these are annotated with ‘display indicators’. The middle row of the screen has the mathematical text 1 add 2 at the left-hand side, annotated with ‘input’. The bottom row has the mathematical text 3 at the right-hand side, annotated with ‘output’.

[Back to - Figure 2 The calculator display](" \l "Session1_Figure2)

# Figure 3 A typical calculator on-screen menu

## Description

The figure shows the display on a calculator screen containing four lines of text. The top row of the screen contains a downward pointing arrowhead towards the right end. First line of text is 1 : M t h I O (written as one word) space 2 : Line I O (written as one word). Second line of text is 3 : Deg space 4 : Rad. Third line of text is 5 : Gra space 6 : Fix. Last line of text is 7 : Sci space 8 : Norm.

[Back to - Figure 3 A typical calculator on-screen menu](" \l "Session1_Figure3)

# Figure 4 ‘Math’ mode

## Description

The top row of the screen contains the letter D (white text on black) in the centre, and the word ‘math’ towards the right end.

[Back to - Figure 4 ‘Math’ mode](" \l "Session1_Figure4)

# Figure 5 The general power key function

## Description

The top row of the screen contains the letter D (white text on black) in the centre, and the word ‘math’ towards the right end. The second row of the screen has the mathematical text 2 with, immediately to the right, a raised small empty box.

[Back to - Figure 5 The general power key function](" \l "Session1_Figure5)

# Figure 6 Syntax Error

## Description

The top row of the screen contains the letter D (white text on black) in the centre, and the word ‘math’ towards the right end. First line of text is Syntax ERROR (in uppercase letters). Second line of text is [ A C (written as one word in uppercase letters) ] : Cancel. Last line of text is [ left pointing arrowhead ] [ right pointing arrowhead ] : Goto.

[Back to - Figure 6 Syntax Error](" \l "Session1_Figure6)

# Figure 7 The cursor, placed after the 3

## Description

The top row of the screen contains the letter D (white text on black) in the centre, and the word ‘math’ towards the right end. The second row of the screen has the mathematical text ( 1 add 3 vertical cursor line superscript 2.

[Back to - Figure 7 The cursor, placed after the 3](" \l "Session1_Figure7)

# Figure 8 A fraction template

## Description

The top row of the screen contains the letter D (white text on black) in the centre, and the word ‘math’ towards the right end. The second row of the screen contains the outline of a fraction consisting of a raised small empty box over a division line with another small empty box beneath the division line.

[Back to - Figure 8 A fraction template](" \l "Session3_Figure1)

# Figure 9 The degrees setting

## Description

The top row of the screen contains the letter D (white text on black) in the centre, and the word ‘math’ towards the right end.

[Back to - Figure 9 The degrees setting](" \l "Session7_Figure1)

# Figure 1 A typical scientific calculator

## Description

A photograph of a Casio scientific calculator f x - 83 E S (natural display) with annotations explaining some of the features.

[Back to - Figure 1 A typical scientific calculator](#Session1_Figure1)

# Figure 2 The calculator display

## Description

The display on a calculator screen with annotations added to explain some of the features.

[Back to - Figure 2 The calculator display](#Session1_Figure2)

# Figure 3 A typical calculator on-screen menu

## Description

The figure shows the display on a calculator screen containing four lines of text.

[Back to - Figure 3 A typical calculator on-screen menu](#Session1_Figure3)

# Figure 4 ‘Math’ mode

## Description

The figure shows the display on a calculator screen.

[Back to - Figure 4 ‘Math’ mode](#Session1_Figure4)

# Figure 5 The general power key function

## Description

The figure shows the display on a calculator screen.

[Back to - Figure 5 The general power key function](#Session1_Figure5)

# Figure 6 Syntax Error

## Description

The display on a calculator screen containing three lines of text showing Syntax Error.

[Back to - Figure 6 Syntax Error](#Session1_Figure6)

# Figure 7 The cursor, placed after the 3

## Description

The figure shows the display on a calculator screen of the cursor, placed after the 3.

[Back to - Figure 7 The cursor, placed after the 3](#Session1_Figure7)

# Figure 8 A fraction template

## Description

The figure shows the display on a calculator screen.

[Back to - Figure 8 A fraction template](#Session3_Figure1)

# Figure 9 The degrees setting

## Description

The figure shows the display on a calculator screen of the degrees setting.

[Back to - Figure 9 The degrees setting](#Session7_Figure1)