AQA GCSE Maths: Higher

Your notes

Using a Calculator

Contents

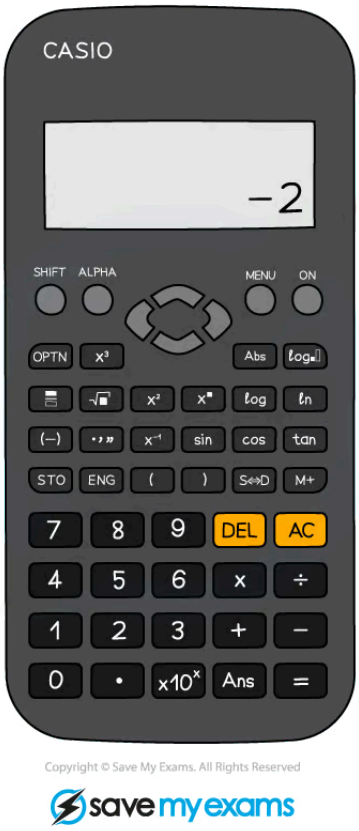
Your notes

Using a Calculator

Why are calculator skills important?

- There are many **special functions** on a scientific calculator
  - To answer questions successfully you need to be able to use your calculator effectively
- You may need to use some of the functions on the calculator in **other subjects** such as Science
- There are many **different models** of calculator
  - Any scientific calculator will have the functions you need but may be **accessed in different ways**
  - You need to know how to use the features on **your specific model**
- If you have an **old** or **very basic** scientific calculator the functions may be used **backwards**
  - To find the sine of an angle on a newer calculator, type sin (57)
  - On an older calculator you may need to type 57 then press the sin button
- The notes below **apply to most if not all scientific calculators** but the images are based on the **Casio fx-83GT**

Your notes



The Casio fx-83GTX Classwiz

How do I make sure that I have the correct settings on the calculator?

- Check you know how change the **mode** of your calculator
  - There is usually a button marked 'MODE'
  - Most calculators default to 'MATH' mode with the word MATH written across the top of the display or using a symbol
- The '**Angle Unit**' needs to be **degrees**
  - There is usually a button marked 'SETUP' where you can find the angle unit options
  - A '**D**' symbol at the top of the display is used to indicate that the calculator is in the degrees setting
- Make sure you can switch between '**exact**' answers (e.g. fractions) and '**approximate**' answers (e.g. decimals)

- When in 'MATH' mode press the **'S ⇔ D' button** to switch between answer types

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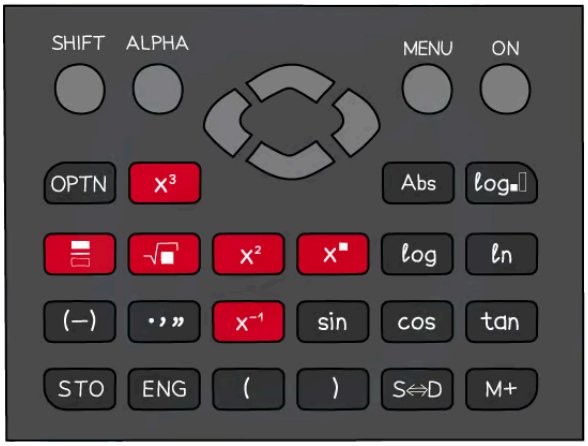
What are the shortcut buttons on the calculator?

- There are several very useful **shortcut buttons** on the calculator that you should know
  - The **fraction**, **square**, **cube**, **power** and **square root** buttons are all frequently used
  - Use the **'SHIFT'** (**2^{nd}** or **INV**) button to access functions including **mixed numbers**, **cube roots**, and **n^{th} roots**



Why is using brackets important?

- **Applying brackets correctly** on your calculator helps you to **avoid errors** in your calculations
  - Use brackets as you would in written mathematics
  - Put brackets around **negative numbers** in calculations
    - Remember, -3^2 gives you a different result to $(-3)^2$
    - Use the **'(-)' button** for negative values, not the minus button

Which buttons are useful for trigonometry?

- Use the **sin**, **cos** and **tan** buttons when finding **missing sides** of a triangle
  - Remember to make sure that your calculator is in **degrees mode**

- Use **sin^{-1}**, **cos^{-1}** and **tan^{-1}** when finding **missing angles** of a triangle
  - Access these by using the **'SHIFT'** button
- When using a **trig function**, the calculator gives you an open bracket '('
  - Remember to use a closed bracket ')' after typing the angle in

Which buttons are useful for standard form and calculations involving π?

- To write a number in **standard form** on the calculator, use the **×10^{x}**
  - Modern calculators display standard form in the way it is written, e.g., 2×10^5
  - Older models may use a small capital letter **'E'** in place of ×10^{x}, e.g., 2E5
- π is often near the standard form button
  - You may need to use the **'SHIFT'** button to access it

What is the Ans function?

- The **Ans** (answer) button **recalls the last answer** the calculator calculated
  - Use this when working with decimals in the middle of solutions to avoid rounding until your final answer

What is the table function?

- If your calculator has a **table** function or mode it can be used in **'complete the table of values and draw the graph'** type questions
  - This can help you to **reduce** the **number of calculations** you have to do
  - It can also help to **reduce errors**

How do I use my calculator for time calculations?

- Remember that **time** can be given in different formats
  - Time can be given in **hours/minutes/seconds**, e.g. 3 hours 46 minutes
  - Time can be given as a **decimal**, e.g. 2.7 hours
- You can use the **degrees, minutes and seconds function** $\boxed{^{\circ}\,'\,''}$ to enter time on your calculator
  - E.g. 3 minutes 45 seconds would be entered as $0°3'45''$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- You can convert between an answer on the calculator, given in either format of time, by pressing this button

Your notes

Examiner Tips and Tricks

- Get a calculator **early** and learn how to use all the **essential functions**
- When using your calculator in an exam do **one calculation at a time**
  - Make sure you **write down** on paper **each calculation** that you do
  - Always write down **more digits** than the final answer requires **in your working**
  - Only **round** your **final answer**

Worked Example

(a) Use your calculator to work out

$$\frac{\sqrt{4.69}}{0.34^3 + \sin(45°)}$$

Give your answer as a decimal.
Write down all the figures on your calculator display.

Type the calculations in the numerator and the denominator into your calculator separately
Write down the decimal answers
Use '...' to show that you have not rounded them
You need to show this working to get full marks

$$\sqrt{4.69} = 2.165\ 64\ ...$$

$$0.34^3 + \sin(45) = 0.746\ 410\ ...$$

Type the whole calculation into your calculator in one go
Use the fraction button, square root button, cube button and remember to close the bracket after the sine function

2. 901406085

(b) Given that

$$a = \frac{p+q}{p^2 q}$$

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Find the value of a when $p = 1.2 \times 10^{-3}$ and $q = 7.83 \times 10^{5}$.
Give your answer to 3 significant figures.

Type the numerator of the right-hand side of the equation into your calculator, substituting in the values for *p* and *q*
Write this down to show your working

$$p + q = 1.2 \times 10^{-3} + 7.83 \times 10^{5} = 783\ 000.0012$$

Type the denominator of the right-hand side of the equation into your calculator, substituting in the values for *p* and *q*
Use brackets when expressions get long or awkward
Write this down to show your working

$$p^2 q = (1.2 \times 10^{-3})^2 \times (7.83 \times 10^{5}) = 1.12752$$

Write down all the digits on your calculator display for the working stages

$$a = \frac{783\ 000.0012}{1.12752} = 694\ 444.4455$$

Round to 3 significant figures

$$\boldsymbol{a = 694\ 000}\ \textbf{(3 s.f.)}$$

(c) Complete the table of values for $y = x^3 - 6x + 1$.

x	-3	-2	-1	0	1	2	3
y		5					10

Use brackets around negative values and the '(-)' button

$$(-3)^3 - 6 \times (-3) + 1 = -8$$

Use arrow keys to go back to the input line and change each '-3' to '-1'

$$(-1)^3 - 6 \times (-1) + 1 = 6$$

Repeat for each of the remaining values in the table, 0, 1 and 2

$$0^3 - 6 \times 0 + 1 = 1$$
$$1^3 - 6 \times 1 + 1 = -4$$
$$2^3 - 6 \times 2 + 1 = -3$$

Alternatively, use the 'Table' mode/feature if your calculator has one

Complete the table with the values

x	-3	-2	-1	0	1	2	3
y	**-8**	5	**6**	**1**	**-4**	**-3**	10

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