BEYOND MATHS

Transitioning to Year 7 Maths

Booklet 1

Scientific Calculator Guide

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Scientific Calculator Guide

In year 7, you will be expected to start using a type of calculator that is different from the more basic calculators that you may have used in year 6. This type of calculator is called a scientific calculator. The most common one used in secondary schools is the Casio fx-85GT model, so this guide will focus on the buttons from that one. It is vital that you know how to use it properly and confidently. Being familiar with the layout of your own scientific calculator will help save time, allowing you to concentrate on the maths you're working on.

General Buttons

There are some general buttons that may be new to you but to get the best out of your calculator, you should aim to master these.

SHIFT	This is usually the first button on the left underneath the screen; it has SHIFT written above it. It may be written in yellow. Pressing the Shift button means you will select the instruction written above the next button you press, rather than what is written on the button itself.
	The replay button has four arrows on it and allows you to direct your cursor on-screen. It's really useful if you enter a large calculation incorrectly, as you can use the arrows to go back and insert or remove characters. Replay also allows you to move between the numerator and denominator when you're working with fractions, or to move out of a root or index.
	The delete button erases characters; when you press it, the character to the left of the cursor will be erased. It can be useful to fix a calculation, when used with the replay button.
	The Ans button can be used to put an answer you have just found back into your next calculation.

BIDMAS

The first mathematical thing to note is that unlike a basic calculator, a scientific calculator recognises the order of operations: BIDMAS (You may also know this as BODMAS).

For example, if you type 5 + 4 × 2 = into a basic calculator, it will give you an answer of 18. This is because it has not been programmed to recognise BIDMAS and treats it as (5 + 4) × 2. With a scientific calculator, it will recognise BIDMAS and perform the multiplication first and then add the 5, giving the correct answer of 13. If a question has brackets in it, you need to type these in using these buttons ( ).

Example

(7 + 3) ÷ 4

First, press the (button to open the brackets then type 7 + 3. Now, close the brackets by pressing the) button then type ÷ 4. Finally, press the = button. You should notice that as you type, the screen will show you (7 + 3) ÷ 4. After pressing =, you will see a display of $\frac{5}{2}$. Press the SD button and it will convert your answer to decimal form; in this case, 2.5.

Try this next question and check whether you get the answer given.

(8 – 2) × 9

You should see (8 – 2) × 9 and an answer of 54.

Your Turn

8. Give each answer as a decimal. Write down all the digits on your calculator display.

   a. $\frac{7.15 + 4 \times -5}{11.2 - 2.85}$ = _____

   b. $\frac{2.85 + 5 \times -4}{10.8 - 2.3^2}$ = _____

Your Turn

4. Evaluate:

   a. -8 + -6 = _____

   b. 7 − -4 = _____

   c. -9 × 12 = _____

   d. 144 ÷ -36 = _____

   e. -10 + -8 × -2 ÷ -1 = _____

5. Convert the fractions to decimals.

   a. $\frac{1}{10}$ = _____

   b. $\frac{12}{200}$ = _____

   c. $\frac{5}{11}$ = _____

6. Convert the decimals to fractions, giving your answers in their simplest form.

   a. 0.07 = _____

   b. 1.25 = _____

   c. 0.6 = _____

7. a. Evaluate $\sqrt{7.2^2 - 1.5^3}$. Write down your full calculator display.

   _____

   b. Round your answer to 2 decimal places.

   _____

Powers and Roots

x^2	This button allows you to square numbers.

Example 1

Calculate 15^2.

Remember, this means 15 × 15. You could type that into your calculator but a shortcut is to type 15 followed by x^2. You will see 15^2 on your screen. Press = to get the answer of 225.

x^3	This button allows you to cube numbers.

Example 2

Calculate 4^3.

Remember, this means 4 × 4 × 4. You could type that into your calculator but, again, a shortcut is to type 4 followed by x^3. You will see 4^3 on your screen. Press = to get 64.

The square and cube buttons work in the same way in longer calculations.

Example 3

Calculate $7 + 3^3$.

Remember, scientific calculators recognise BIDMAS. If you type 7 + 3 x^3 = then you should see $7 + 3^3$ on your display and an answer of 34.

	This button allows you to square root numbers. Additionally, you can press shift followed by the $\sqrt{\blacksquare}$ button to enter cube roots ($\sqrt[3]{\blacksquare}$). Before you continue entering your calculation, you must use the right arrow on the replay button to move out of the root symbol.

Example 4

Calculate $\sqrt{225}$.

This means what value, when multiplied by itself, equals 225?

Press the $\sqrt{\blacksquare}$ button then type in 225. Now, use the right arrow on the replay button to move out of the root symbol. This is especially important if the square root is part of a longer question. You should see $\sqrt{225}$ on your screen. Now, press = to get an answer of 15.

Example 5

Calculate $\sqrt[3]{27}$.

This means what value, when multiplied by itself, then by itself again, equals 27?

Press the **SHIFT** button followed by the $\sqrt{\blacksquare}$ button then type in 27. Now, use the right arrow on the replay button to move out of the root symbol. You should see $\sqrt[3]{27}$ on your screen. Press = to get an answer of 3.

Your Turn

Use your calculator to work out the answer to each question. Don't forget to use the S⇔D button to give the answers in the required format.

1. Work these out on paper first and then check your answer on your calculator.
   a. $5 + 7 \times 2 =$ _____
   b. $(15 - 6) \div 3 =$ _____
   c. $3^2 + 4 \times 1 =$ _____
2. Evaluate:
   a. $14^2 =$ _____
   b. $7^3 =$ _____
   c. $\sqrt{225} =$ _____
   d. $\sqrt[3]{64} =$ _____
3. Calculate:
   a. $\frac{6}{7} + \frac{2}{5}$, giving your answer as a mixed number fraction in its simplest form.

      _____

   b. $3\frac{2}{9} \times \frac{16}{17} - \frac{3}{5}$, giving your answer as a mixed number fraction in its simplest form.

      _____

Negative Numbers

	You should input negative numbers into your calculator using (-). When using this button, the brackets won't appear on the display. **Top Tip:** Be careful when inputting any negative numbers which are raised to a power.

Example 1

-8 × -2

Press the (-) button before 8, press the × button and then press the (-) button again before 2. You will see -8 × -2 on your display. Press = to get your answer of 16. Note, there is no negative sign as a negative number multiplied by a negative number results in a positive answer.

Example 2

Evaluate $(-8)^2$.

You will need to use the bracket buttons for this one.

Press ((-) 8) x^2 and then press =, giving an answer of positive 64.

Fractions, Decimals and Surds

	This button allows you to enter fractions. If you press SHIFT then the fraction button, you'll be able to enter a mixed number. Three boxes will appear onscreen. Use the replay button to move the cursor and input each part of your fraction. Before you continue entering your calculation, you must use the right arrow on the replay button to move out of the fraction. $\square\frac{\square}{\square}$ $2\frac{2}{3}$

Example 1

$\frac{1}{2} + \frac{5}{7}$

Press the button and type 1 into the numerator. Now, use the down arrow on the replay button to move to the denominator and type 2. Use the right arrow on the replay button to exit the fraction. Press + and then enter the second fraction $\frac{5}{7}$ in the same way. You should now see $\frac{1}{2} + \frac{5}{7}$. Press = and you should see $\frac{17}{14}$.

Example 2

$2\frac{2}{3} - 1\frac{1}{8}$

Press the **SHIFT** button followed by the  button. You can now enter the first fraction by typing a 2 and then, using the arrow keys, enter the numerator (2) and the denominator (3) of the fraction. Use the right arrow to move to the end of the fraction and press the − button followed by the **SHIFT** button again. Then, enter the second mixed number in the same way you entered the first one and press =. Your screen will show the improper fraction $\frac{37}{24}$.

	The SD button changes the form of your answer from a decimal or standard form to either a fraction, a surd or an answer in terms of π, depending on the result. Each time you press it, you'll get the answer in a different form. If you press **SHIFT** then SD, improper fractions will be converted into mixed numbers and vice versa.

A surd will have a square root, cube root or other root symbol. To discover a more in-depth description of a surd, see booklet 2.

Example 3

Let's convert our answer from the example above, $\frac{17}{14}$, to a mixed number.

You need to press **SHIFT** then S⇔D. This will then show you the answer as a mixed number: $1\frac{3}{14}$.

Example 4

Convert $\frac{1}{3}$ to a decimal.

Use your fraction button to enter the fraction $\frac{1}{3}$ and press the = button. Now, press the S⇔D button and you will see it has converted your fraction to a decimal: $0.\dot{3}$. Note that this is a recurring decimal. To see the full calculator display, press the S⇔D button again and your screen will show 0.3333333333. If you want to return to the original fraction, just press the S⇔D button again.