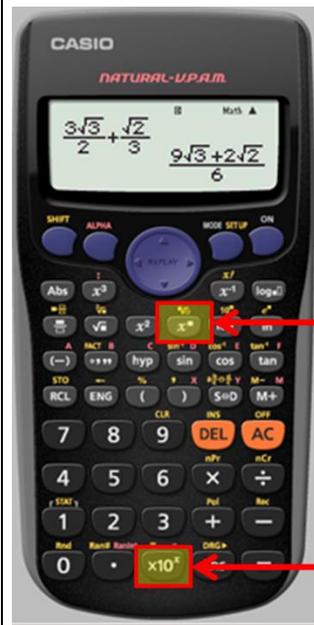


Key Vocabulary	
Powers / Exponents Index / Indices $7^4 = 7 \times 7 \times 7 \times 7$	The number times itself that many times is the power
Root $\sqrt{64} = 8$ (as $8^2 = 64$) $\sqrt[3]{27} = 3$ (as $3^3 = 27$)	The opposite of operation of raising to a power
Inequality larger $\begin{matrix} \updownarrow \\ > \end{matrix}$ smaller	Symbols for : Less than (<) Greater than (>) Less than & equal (\leq) Greater than & equal (\geq)
Standard form $5\,700\,000 = 5.7 \times 10^6$ $0.0076 = 7.6 \times 10^{-3}$	A way of writing down very large or very small numbers easily. A number in standard form is a number between 1 and 10 multiplied by a power of 10
Upper bound 4.3 rounded to 1dp UB = 4.35 (NB this would round up to 4.4 but by definition it is the upper bound)	The largest value a rounded number can be
Lower bound 4.3 rounded to 1dp LB = 4.25	The smallest value a rounded number can be
Error interval x = 4.3 rounded to 1 dp error interval $4.25 \leq x < 4.35$	Inequality used to describe a range of values a rounded number can be

Key facts / Diagrams



Lets you evaluate any power and root

Use this to put numbers in standard form

Make sure you can use your scientific calculator

Standard form

Write the following in standard form

- a) $531\,000 = 5.31 \times 10^5$
- b) $0.0082 = 8.2 \times 10^{-3}$

Write the following as ordinary numbers

- a) $3.7 \times 10^4 = 37\,000$
- b) $1.92 \times 10^{-2} = 0.0192$

The following are *not* in standard form, convert them to standard form

- a) $45 \times 10^6 = 4.5 \times 10^7$
- b) $0.52 \times 10^3 = 5.2 \times 10^2$

Common misconceptions

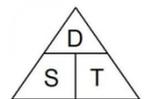
- Some students may think that any number multiplied by a power of 10 qualifies as a number written in standard form.
- Some pupils may think rounding 34 934 to one significant figure is 3. Correct answer is 30 000

Worked examples

1. Find the value of \square

- a) $12^\square = 1$ $\square = 0$
- b) $\sqrt[\square]{64} = 4$ $\square = 3$
- c) $3^\square = 81$ $\square = 4$

2. A snail has a top speed of 2.8×10^{-3} m/s. The earth has a circumference of 4×10^7 metres. Use your calculator to work out the time it would take a snail to crawl this distance. Give your answer in seconds to two significant figures.



$\text{Time} = \text{Distance} \div \text{Speed}$
 $\text{Time} = 4 \times 10^7 \div 2.8 \times 10^{-3}$
 $\text{Time} = 1.428571429 \times 10^{10} \rightarrow 1.4 \times 10^{10}$ to 2 sf

3. Write down the upper and lower bounds for the following as an error interval:

- a) x = 3.7 rounded to one decimal place
 $3.65 \leq x < 3.75$
- b) y = 300 rounded to the nearest hundred
 $250 \leq y < 350$