Estimation

Estimating gives us an approximate answer.

When estimating round each number to 1 significant figure then do the calculation.

Example:

Estimate $(58.4 \div 2.79) - 9.8$.

Rounding to 1 significant figure gives:
$(60 \div 3) - 10 = (20) - 10 = 10$

Therefore: $(58.4 \div 2.79) - 9.8 \approx 10$.

Rounding rule

5 or more round up, less than 5 round down.

Index Laws

When multiplying with indices you add the indices.

Example: $m^a \times m^b = m^{a+b}$

When dividing with indices you subtract the indices.

Example: $m^a \div m^b = m^{a-b}$

When using brackets you need to multiply the indices together and raise any whole number to the power.

Example: $(3a^2)^3 = 27a^6$

Year 9 Higher Topic 1

Topic title: Number

What careers would use these skills?

Rounding is important in finance, money is always written with two decimal places.

Rational and Irrational Numbers

A rational number can be written in the form $^a/_b$ where a and b are integers. It can be an integer, a terminating decimal or a percentage.

An irrational number cannot be written in the form $^a/_b$.

What did the zero say to the eight?

Nice belt!

Simplifying Surds

To simplify surds find the highest square number factor and its factor pair. Simplify by square rooting the square number.

Example: $\sqrt{75} = \sqrt{25}\sqrt{3} = 5\sqrt{3}$

Multiplying and Dividing Surds

Multiply or divide the surds. When the number is the same it becomes a rational number.

Example: $\sqrt{6} \times \sqrt{5} = \sqrt{30}$ Example: $\sqrt{30} \div \sqrt{5} = \sqrt{6}$

Example: $\sqrt{3} \times \sqrt{3} = \sqrt{9} = 3$ Example: $\sqrt{5} \div \sqrt{5} = \sqrt{1} = 1$
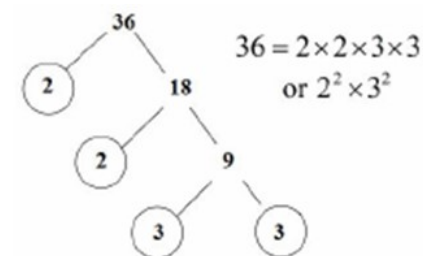
Rounding with decimal places

Eg. Round 0.372 to 2 decimal places.

In the number 0.372, the 7 is in the second decimal place. 0.372 rounded to two decimal places is 0.37, because the 2 tells us to round down.

Be careful with money - don't write £27.4, instead write £27.40

Standard Form

Standard form is a way of expressing very large or very small numbers. Standard form must be written in the form $a \times 10^b$
a must be between 1 and 10.

Example:
$0.000000541 = 5.41 \times 10^{-7}$

$123000000 = 1.23 \times 10^8$

Prime factor decomposition

Finding out which **prime numbers multiply** together to make the **original** number.

$36 = 2 \times 2 \times 3 \times 3$
or $2^2 \times 3^2$

Highest common factor (HCF)

The **biggest** number that **divides exactly** into two or more numbers.

Eg. The HCF of 6 and 9 is 3 because it is the biggest number that divides into 6 and 9 exactly.

Lowest common multiple (LCM)

The **smallest** number that is in the **times tables** of each of the numbers given.

Eg. The LCM of 3, 4 and 5 is 60 because it is the smallest number in the 3, 4 and 5 times tables .

Rationalising a Denominator

If a denominator has a surd it needs to be rationalised. Multiply the numerator and denominator by the original denominator.

Example:

$$\frac{5}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{2}}{\sqrt{4}}$$

$$= \frac{5\sqrt{2}}{2}$$

Why do plants hate math?
Because it gives them *square* roots.