

## Maths Top Tips – Unit 2 Foundation

### Percentage means "fraction out of 100"

50% = 0.5 =  $\frac{1}{2}$  ..... divide by 2  
 25% = 0.25 =  $\frac{1}{4}$  ..... halve then halve again  
 10% = 0.1 =  $\frac{1}{10}$  ..... divide by 10  
 1% = 0.01 =  $\frac{1}{100}$  ..... divide by 100

To calculate a **percentage increase** (or decrease), find the **percentage** and **add it on** (or take it away)

Eg to increase 120m by 15%  
 10% of 120m = 12m      5% of 120m = 6m  
 15% of 120m = 12 + 6 = 18m  
 120m + 18m = 138m

### Negative Numbers

Replace - - with +      eg  $3 - (-4) = 3 + 4 = 7$   
 Replace + - with -      eg  $3 + (-4) = 3 - 4 = -1$

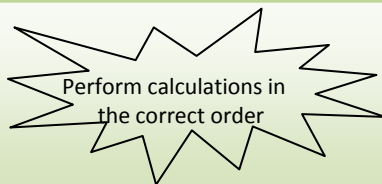
+ × + = +      eg  $3 \times 4 = 12$       + ÷ + = +  
 - × + = -      eg  $(-3) \times 4 = -12$       - ÷ + = -  
 + × - = -      eg  $3 \times (-4) = -12$       + ÷ - = -  
 - × - = +      eg  $(-3) \times (-4) = 12$       - ÷ - = +

### Fractions of...

To find a **fraction of an amount** you **divide by the bottom** and **times by the top**

Eg to find  $\frac{2}{3}$  of 18m you do  $18 \div 3 = 6$  then  $6 \times 2 = 12m$

BRACKETS  
 INDICES  
 DIVISION  
 MULTIPLICATION  
 ADDITION  
 SUBTRACTION



### Laws of Indices

$y^a \times y^b = y^{a+b}$        $y^a \div y^b = y^{a-b}$   
 $(y^a)^b = y^{a \times b}$        $y^0 = 1$

### $y = mx + c$ (equation of a straight line)

m = gradient      c = y-intercept  
 gradient (steepness) =  $\frac{\text{change in } y}{\text{change in } x}$

### Adding and Subtracting Fractions

Make sure the fractions have a common denominator before you add/subtract them

eg  
 $\frac{3}{5} + \frac{2}{7} = \frac{21}{35} + \frac{10}{35} = \frac{31}{35}$   
 $\frac{7}{8} - \frac{1}{6} = \frac{21}{24} - \frac{4}{24} = \frac{17}{24}$

### Types of Number

**odd** – ends in 1, 3, 5, 7, 9  
**even** – ends in 0, 2, 4, 6, 8 (is divisible by 2)  
**factor** – divides exactly into a number  
 eg 5 is a factor of 10  
**multiple** – in the times table of a number  
 eg 20 is a multiple of 10  
**prime number** - can only be divided by one and itself: 2, 3, 5, 7, 11, 13, 17, 19... are prime  
**Highest Common Factor (HCF) of 2 numbers** – the largest value that divides exactly into both numbers  
**Lowest Common Multiple (LCM) of 2 numbers** – the smallest value that is in the times tables of both numbers

### nth terms

First find out how you get from term to term – this tells you the times table the sequence is based on

eg 4, 7, 10, 13, ... goes up in 3s so the sequence is based on the 3x table (**3n**)

Then find out what you need to add or subtract from this times table to get the required sequence.

eg 4, 7, 10, 13, ... is one more than the 3x table so the nth term is **3n + 1**

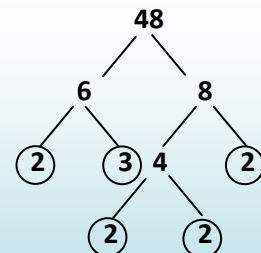
### To plot straight lines

you can use

- a table of values
- the 'cover-up' method
- y-intercept and gradient

Check the scale carefully.

### Product of Prime Factors



$48 = 2 \times 2 \times 2 \times 2 \times 3$   
 $= 2^4 \times 3$  (index form)

### triangle numbers

1 ●  
 3 ● ●  
 6 ● ● ●  
 10 ● ● ● ●  
 etc

### square numbers

$1^2 = 1$   
 $2^2 = 4$   
 $3^2 = 9$   
 $4^2 = 16$   
 $5^2 = 25$   
 $6^2 = 36$   
 $7^2 = 49$   
 $8^2 = 64$   
 $9^2 = 81$   
 $10^2 = 100$   
 $11^2 = 121$   
 $12^2 = 144$   
 $13^2 = 169$   
 $14^2 = 196$   
 $15^2 = 225$

### square roots

$\sqrt{1} = 1$   
 $\sqrt{4} = 2$   
 $\sqrt{9} = 3$   
 $\sqrt{16} = 4$   
 $\sqrt{25} = 5$   
 $\sqrt{36} = 6$   
 $\sqrt{49} = 7$   
 $\sqrt{64} = 8$   
 $\sqrt{81} = 9$   
 $\sqrt{100} = 10$   
 $\sqrt{121} = 11$   
 $\sqrt{144} = 12$   
 $\sqrt{169} = 13$   
 $\sqrt{196} = 14$   
 $\sqrt{225} = 15$

### cube numbers

$1^3 = 1$   
 $2^3 = 8$   
 $3^3 = 27$   
 $4^3 = 64$   
 $5^3 = 125$   
 $10^3 = 1000$

### cube roots

$\sqrt[3]{1} = 1$   
 $\sqrt[3]{8} = 2$   
 $\sqrt[3]{27} = 3$   
 $\sqrt[3]{64} = 4$   
 $\sqrt[3]{125} = 5$   
 $\sqrt[3]{1000} = 10$