Grade 6 - 7 PROMPT sheet

B/1 Change recurring decimal to fraction

If $x = 0.4444444$	If $x = 0.54545$
$10x = 4.4444444$	$100x = 54.545454$
$9x = 4$	$99x = 54$
$x = \dfrac{4}{9}$	$x = \dfrac{54}{99}$

B/2 Repeated percentage change

To increase £12 by 5% per year for 4 yr
$= 1.05^4 \times £12$
To decrease £50 by 12% per year for 4 yr
$= 0.88^4 \times £50$

B/2 To find the original quantity

~If an amount has been increased by 5%
Original amount = new amount ÷ 1.05
~If an amount has been decreased by 12%
Original amount = new amount ÷ 0.88

B/3 Standard Form

~ $a \times 10^n$
a is between 1 & 10; n is an integer
~ When mult/div in standard form,
work out number part separate from the
power of 10 part
e.g. $3 \times 10^5 \times 4 \times 10^3 = 12 \times 10^8 = 1.2 \times 10^9$

~ With a calculator use $\boxed{EXP}$ or $\boxed{x10^x}$

B/4 Factorise a quadratic expression

$x^2 - 3x - 4 = (x - 4)(x + 1)$

$x^2 - 25 = (x - 5)(x + 5)$

Difference
of 2

B/5 Expand 2 brackets

- Use F O I L

$(x + 3)(x - 2)$

F   O   I   L
$x^2 - 2x + 3x - 6$
$= x^2 + x - 6$

B/6 Change the subject of a formula

- Isolate the new subject
- Use balancing

Make c new subject	Make x new subject
$f = 3c - 4$	$ax + bx = ay$
$3c - 4 = f$ (+4)	$x(a + b) = ay$
$3c = f + 4$ (÷3)	$x = \dfrac{ay}{a + b}$
$c = \dfrac{f + 4}{3}$	

B/7 Evaluate algebraic formulae

Rewrite the formula with numbers
replacing letters

- WITH A CALCULATOR

Use fraction key ▨ or ▨

Use (-) key for negative numbers

- WITHOUT A CALCULATOR

Remember the rules for negative numbers

-+ = -	- X + = -
-- = +	- X - = +

B8 Solve simultaneous equations by an algebraic method

- Make the number of ys the same
- Add or subtract to eliminate the ys
  Same signs ~ subtract
  Different signs ~ add
- Find the value of x
- Substitute the value of x to find y

e.g. $2x - 3y = 11$ (x2)
              $5x + 2y = 18$ (x3)

              $4x - 6y = 22$
              $15x + 6y = 54$
Add the two equations to eliminate y
              $19x = 76$
              $\underline{x = 4}$
Substitute x = 4 into one of the equations
              $5x + 2y = 18$
              $5 \times 4 + 2y = 18$
              $20 + 2y = 18$
              $2y = -2$
              $\underline{y = -1}$

B8 Solve simultaneous equations graphically

- Draw the graphs of the equations
- Find where they cross
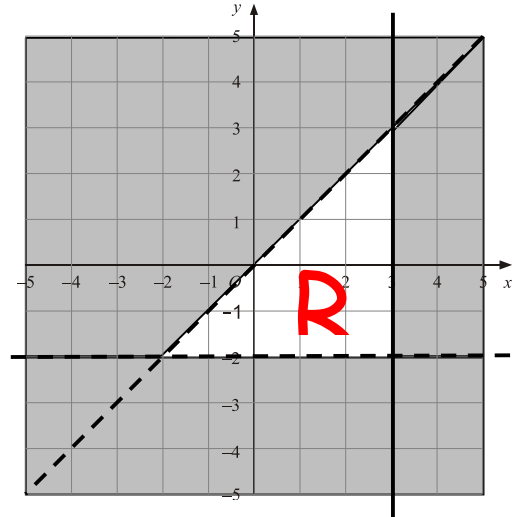

Solution is x = 2, y = 3

B/9 Represent inequalities graphically

First plot the straight line.
Decide which side of the line to shade.
Leave the region required unshaded.
e.g. $x \leq 3$ $y > -2$ $y < x$

B/10 Identify graphs

- Learn the basic shapes of graphs
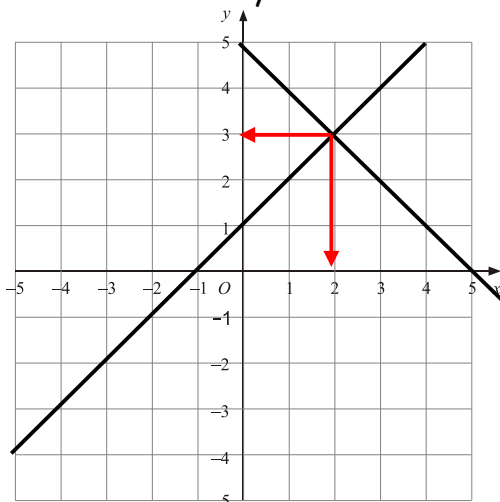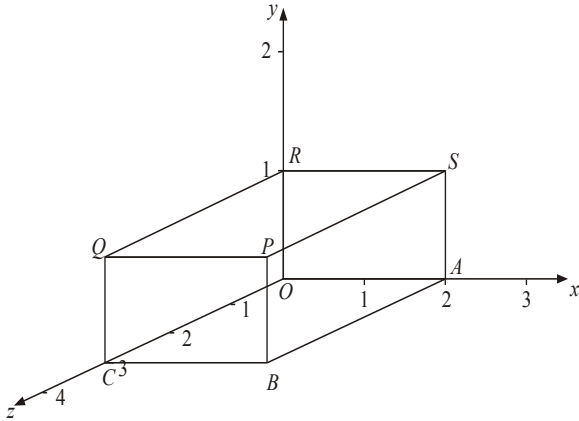
Linear graphs – straight line - equation in x
Quadratic graph – parabola – equation in x^2
Cubic graph – S—shape – equation in x^3
Reciprocal graph – equation e.g $y = \dfrac{3}{x}$

B/11 Effect of adding/multiplying by a constant on a graph

Original graph $y = x^2$	
New equation	**Change in graph**
$y = x^2 + 2$	Move up 2
$y = x^2 - 2$	Move down 2
$y = 2x^2$	Stretch from x-axis in y-direction – scale factor 2
$y = \frac{1}{2} x^2$	Stretch from x-axis in y-direction – scale factor $\frac{1}{2}$

B/12 Coordinates in 3D

In 3D there are 3 axes, x, y and z
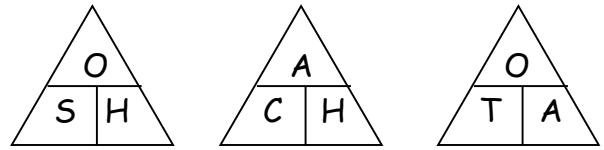The coordinates of a point are (x, y, z)

Example

On the grid the vertex P is (2, 1, 3)

B13 Similarity

If one shape is an enlargement of the other, we say they are similar.

- Corresponding angles are equal
- Corresponding sides have proportional lengths

Example – these 2 triangles are similar

Scale factor = 6 ÷ 4.8 = 1.25
X = 8 ÷ 1.25 = 6.4cm

N.B.
Always draw the 2 triangles separately and the same way up – it is easier to spot the sides that correspond to each other

B/14 Trigonometry

SOH   CAH   TOA

EXAMPLES

$\sin x = \dfrac{4}{5}$	$\cos 28° = \dfrac{x}{5}$	$\tan 28 = \dfrac{5}{x}$
$\sin x = 0.8$	$x = 5 \times \cos 28°$	$x = \dfrac{5}{\tan 28}$
$x = \sin^{-1}(0.8)$	$\underline{x = 4.4}$	
$\underline{x = 53.1°}$		$\underline{x = 9.4}$

B/15 Difference between formulae for length, area and volume

- Numbers and π have no dimensions
- Length x length = area
- Length x length x length = volume

Example:

$5abc + 3a^2b$ (Ignore the numbers)
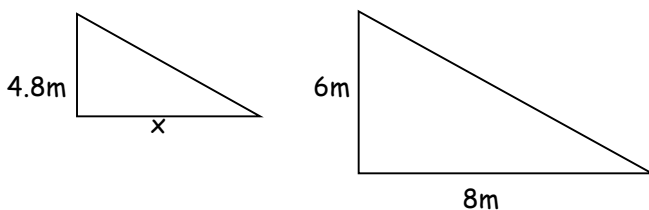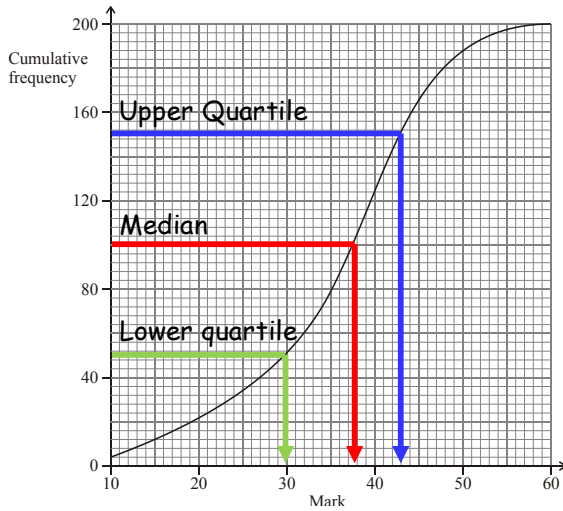➤ a x b x c + a x a x b
➤ volume   +   volume
➤ **volume**

B/16 Median, quartiles & interquartile range from cumulative frequency graph

Median = 38 marks
Upper quartile = 43 marks
Lower quartile = 30 marks
Interquartile range = 43 – 30 = 13 marks

B/16 Box plot
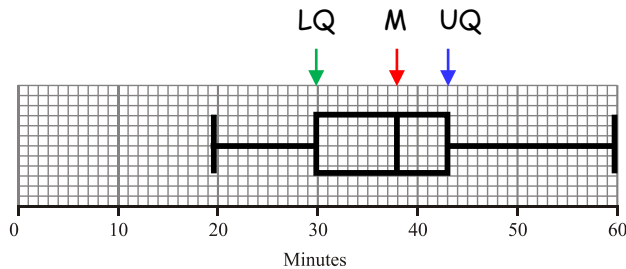
B/17 Compare distributions.0000

- Mean, median & mode compare size
- Range & interquartile range compare spread
- Distributions can be compared visually using a box plot

B/18 Add or multiply two probabilities

P(A **or** B) = p(A) **+** p(B)

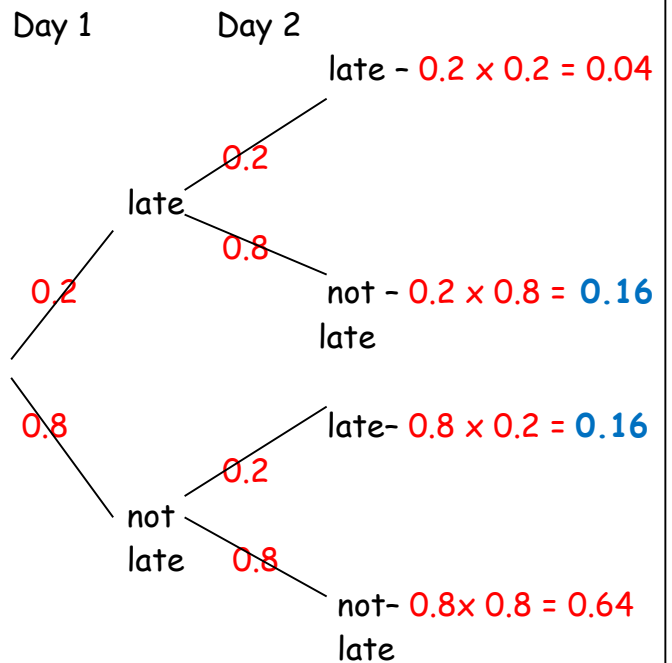P(A **and** B) = p(A) **x** p(B)

If you get an answer to a probability question that is more than one, you have most certainly added instead of multiplied

B/19 Tree Diagrams

- When going along the branches. MULTIPLY the probabilities

- If more than one route is wanted, ADD the probabilities

Example:
The probability that Jane is late = 0.2

Day 1   Day 2
                        late – 0.2 x 0.2 = 0.04
            0.2
    late
            0.8
0.2   not – 0.2 x 0.8 = **0.16**
                        late

0.8   late– 0.8 x 0.2 = **0.16**
            0.2
    not
    late   0.8
                        not– 0.8x 0.8 = 0.64
                        late

To find the probability of late on only one day:

day1 & day2 late not late	OR	day1 & day 2 not late late
= **0.16**	**+**	**0.16**
= **0.32**		