



HEART OF ENGLAND
Creating Futures

MATHEMATICS

Pre-GCSE Skills Booklet

**To be completed and handed in to your new
Y10 Maths teacher when we return.**

**MathsWatch clip numbers have been
provided, to help you if you get stuck.**

NAME

MW Clip	KEY SKILLS
No clip	Use mathematical notation/symbols correctly & show working out
No clip	Know & use times-tables up to 12
N13a, N14a, N15a, N16, N19	Add, subtract, multiply & divide with integers, including negative numbers
N2b, N13b, N14b, N15, N17	Add, subtract, multiply & divide with decimals
N36, N37	Add subtract, multiply & divide with fractions
N20	Know and use the order of operations (BIDMAS)
N10, N11, N31	Find factors & multiples of numbers
N32	Convert between and compare fractions, decimals & percentages.
N25	Know square numbers up to 15 and cube numbers up to 5, plus powers of 10
N25	Understand indices including $\sqrt{\quad}$ and $\sqrt[3]{\quad}$
A20	Use inequality symbols between pairs of numbers
R9	Increase & decrease an amount by a given percentage
R5	Share in a given ratio and link ratio to fractions
A1	Read & plot co-ordinates in 4 quadrants
A6	Simplify algebraic expressions by collecting like terms
A8, A9	Expand & factorise expressions with a single bracket
A10	Substitute values into an expression or formula
A11	Use & find the nth term of a linear sequence
A14	Plot straight line graphs
A12	Solve 1-, 2- & 3-step linear equations
A5	Scale axes accurately for co-ordinate & data presentation purposes
G11, G12	Name 2D & 3D shapes
G9, G20, G22	Find the area & perimeter of rectangle, triangle, parallelogram, trapezium & circle.
G13, G18	Know angle rules, including angles in parallel lines.
G19	Find interior & exterior angles of polygons
G3, G4, G6, G7	Identify reflection & rotational symmetry in 2D shapes
G21	Calculate volume & surface area of cuboids
S2, S9	Draw bar charts, line graphs & pie charts
S6	Calculate mean, median, mode & range for a small data set
P2, P3	Determine probability for single and multiple events

Find:

a) $\frac{1}{2}$ of 22

b) $\frac{1}{15}$ of 4500

c) $\frac{7}{100}$ of 300

d) $\frac{3}{8}$ of 32

Calculate, simplifying your answer if possible:

e) $\frac{3}{4} - \frac{2}{7}$

f) $2\frac{3}{5} - 1\frac{2}{7}$

g) $\frac{1}{3} \times \frac{4}{5}$

h) $\frac{5}{8} \div \frac{2}{3}$

i) $7 \div \frac{1}{2}$

Complete the tables:

Fraction	Decimal	Percentage
		50%
	0.25	
$\frac{1}{10}$		
$\frac{1}{3}$		
	0.7	
		40%

Fraction	Decimal	Percentage
$\frac{68}{100}$		
		35%
	0.6	
	$0.\dot{6}$	
		5%
$\frac{13}{50}$		

Fill in the missing number for each problem:

a) $\square - 3 \times 8 = -13$

b) $39 \div \square + 9 \times 3 = 30$

c) $7 + 4 \div \square - 5 = 4$

d) $\square \div 6 + 4 \times 2 - 18 = -8$

e) $22 \div 11 + 4 - 8 \times \square = -18$

Without a calculator:

a) Find 20% of 40

d) Find 5% of 30

b) Decrease 72 by 15%

e) Increase 68 by 55%

c) Increase 28 by 82%

f) Decrease 300 by 81%

Ratio:

a) Simplify 24:80

b) Simplify 77:42

c) Share 60m in the ratio 7:5

d) Divide £120 in the ratio 5:1:2

Simplify, by collecting like terms:

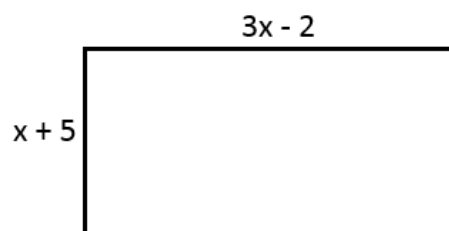
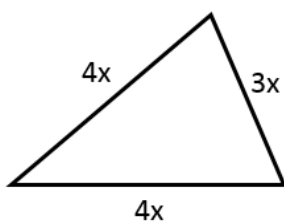
a) $5x + 2y - x$

b) $6x + 8 + 3x - 5$

c) $7x - y - 3x - 4y$

d) $5a + 2a - 4c - a + 3c$

e) Write an expression for the perimeter of these 2 shapes, in the simplest form:



If a = 3 and b = 5, evaluate:

a) $4a$

b) a^2

c) $3a + 2b$

d) ab

e) $6a - 4b$

f) $b^2 - a$

If x = 7 and y = -2, find the following:

g) $3x$

h) $4y + 10$

i) $5x - 3y$

j) $2x^2 + 11y$

Expand:

a) $9(x - 7)$

b) $6(4x + 5)$

c) $5(2x + y)$

d) $7(8x - 9y)$

Expand and simplify:

e) $5(x + 3) + 2(3x - 6)$

f) $4(2x - 6) - 3(5x + 4)$

Factorise fully:

g) $14x - 21$

h) $24 + 18y$

i) $6x^2 - 9x$

j) $25xy - 15y$

Find the n^{th} term and the 10^{th} term for each of these sequences:

Sequence	n^{th} term	10^{th} term
a) 4, 7, 10, 13, 16, 19, ...		
b) 8, 13, 18, 23, 28, 33, ...		
c) 2, 8, 14, 20, 26, 32, ...		
d) -3, -1, 1, 3, 5, 7, 9, ...		

Solve these equations:

a) $6x + 7 = 19$

b) $5x - 2 = 18$

c) $4x + 3 = 2x + 11$

d) $5x + 18 = 2x + 3$

e) $x^2 = 81$

f) $2(5x - 2) = 1$

Averages and Range:

Here are the test marks of some students: 12, 14, 15, 23, 10, 17, 15, 19, 11, 22, 18

- a) What is the mode?
- b) Work out the median mark
- c) Calculate the mean mark
- d) What is the range?

A card is drawn from a well-shuffled deck of 52 cards.

What is the probability of drawing:

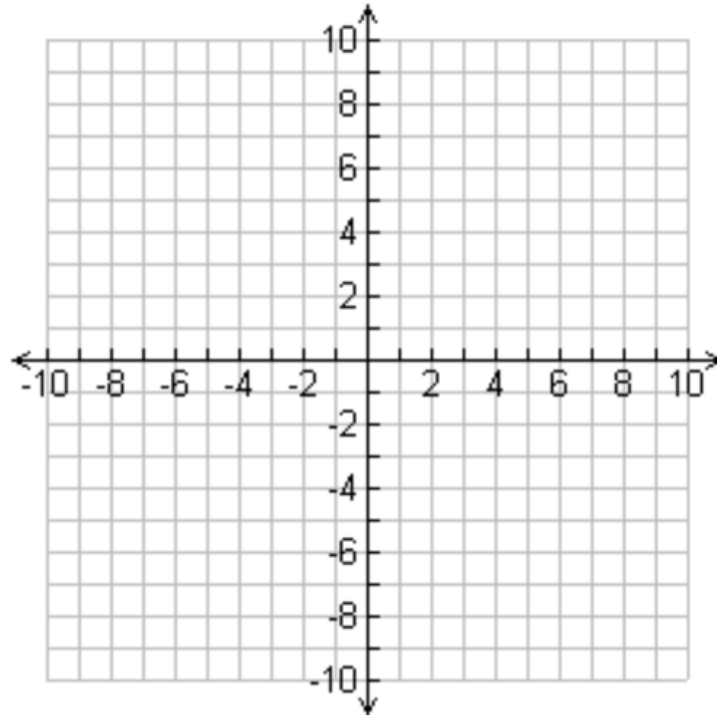
- a) $P(\text{ace}) =$
- b) $P(\text{face card: K, Q, J}) =$
- c) $P(\text{a red 10}) =$
- d) $P(\text{NOT a diamond}) =$
- e) $P(6 \text{ of clubs}) =$

Complete the table of values for:

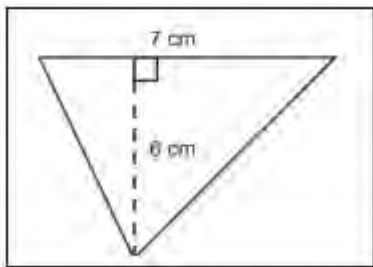
$$y = 2x - 1$$

x	-2	-1	0	1	2	3
y						

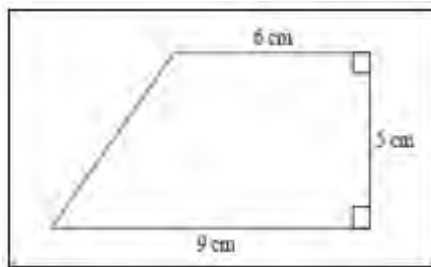
Plot the coordinates below and join them with a straight line to draw the graph of $y = 2x - 1$



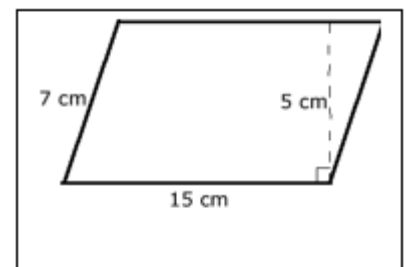
Calculate the area of the shapes:



a) Area =



b) Area =



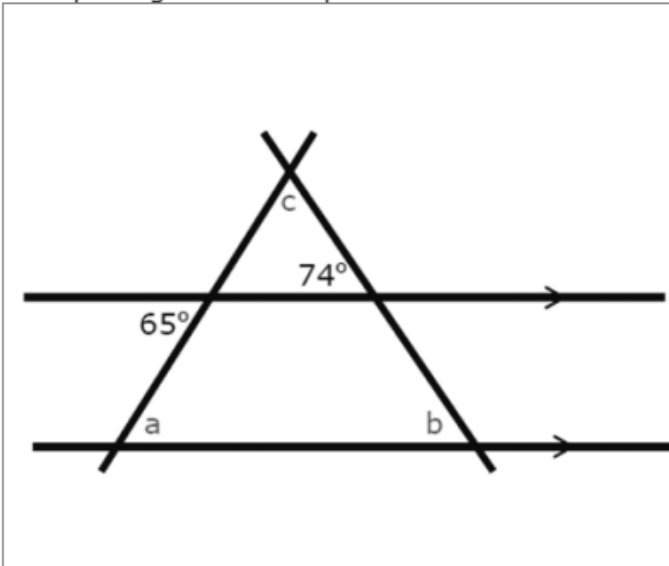
c) Area =

Calculate the circumference and area of:

d) A circle of radius 10cm

e) A circle of diameter 16mm

Find the size of the labelled angles, giving a reason for each one:



a = ° because

.....

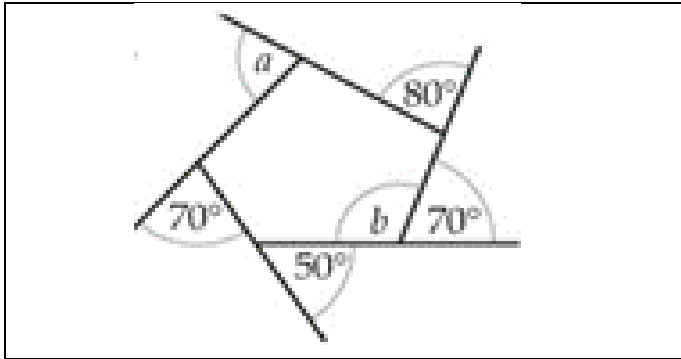
b = ° because

.....

c = ° because

.....

Find the labelled angles in this polygon:



a =

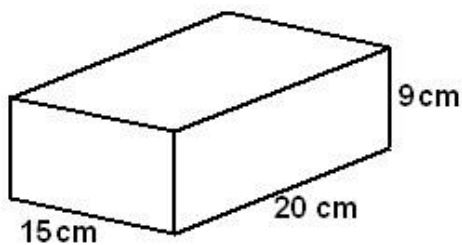
because

b =

because

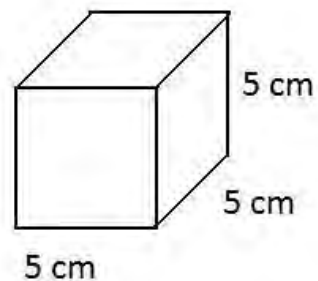
What are the interior and exterior angles of a regular octagon?

Calculate the volume of this cuboid



Volume =

Calculate the surface area of this cube



Surface Area =