Pop Quiz: Direct and Inverse Proportion

Name: ……..

(1) Which type of proportion (direct proportion or inverse proportion) do the following questions describe?

(a) The number of baked beans tins bought and the total price of the tins.

……

(b) The time taken to paint a bridge and the number of workers available to do the painting.

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[2]

(2) At a speed of 60 km per hour a train takes 90 minutes to complete a journey. How much time would the same journey take at a speed of 50 km per hour?

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[2]

(3) It takes 6 hours for 5 printers to produce 15,000 posters. How many printers would be required to produce 18,000 posters in 4 hours?

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[3]

/ 7

Pop Quiz: Proportion Equations Name: .....

(1) y is in proportion to x. Given that $y = 4$ when $x = 3$, find the equation that connects x to y.

.....

.....

.....

[3]

(2) y is in inverse proportion to x. Given that $y = 7$ when $x = 6$,

(a) Find the equation that connects x to y

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(b) Calculate y when $x = 3$

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(c) Calculate x when $y = 2$

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[5]

(3) The table on the right shows measures x and y.
Find the equation that describes the proportion that is between the measurements.

x	2	6
y	20	180

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[5]

/ 13

Pop Quiz: Quadratic Nth Term Name: ……..

/ 8

(1) Find the nth term of each of the following sequences.

(a) 87, 84, 81, 78, 75, ...

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[2]

(b) –5, –2, 3, 10, 19, ...

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[2]

(c) 2, 15, 34, 59, 90, ...

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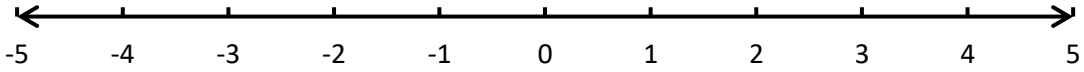
[4]

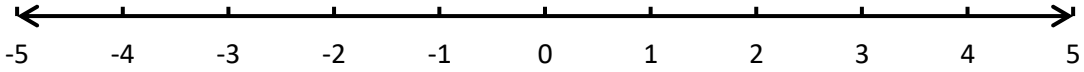
Pop Quiz: Inequalities Name: ……

(1) Use the number lines below to display the following inequalities.

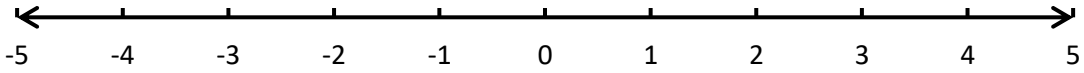
(a) $x \leq 3$



(b) $x > -1.5$



(c) $-4 < x \leq 2$



[3]

(2) Solve the following inequalities.

(a) $x + 5 > 12$

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(b) $-4x \leq 20$

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[2]

(c) $5x - 2 < 3x + 46$

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(d) $3(2 - x) \geq 15$

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[6]

(3) List the whole numbers that satisfy the inequality $10 < 3x + 4 \leq 28$.

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[3]

(4) Steffan is a bus driver. Legally, bus drivers cannot drive more than 10 hours in a single day.
Yesterday, Steffan drove his bus for x hours, which was legal.
Write this information down as an inequality.

……

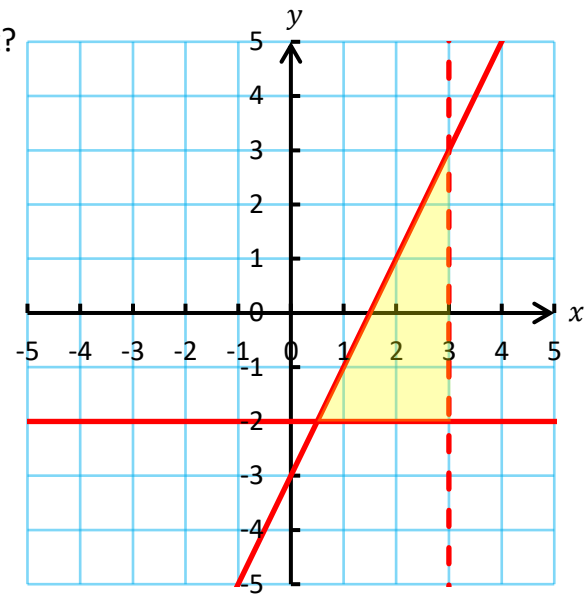
[1]

/15

Pop Quiz: Regions of Graphs

Name: .....

(1) What inequalities define the region shown on the right?



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[3]

(2) On the graph paper below, shade the region that satisfies **every one** of the following inequalities.

$$x + 2y \leq 8$$
$$y \geq x - 2$$
$$x > 2$$
$$y \geq 1$$

Make sure to clearly show the region that represents your answer.

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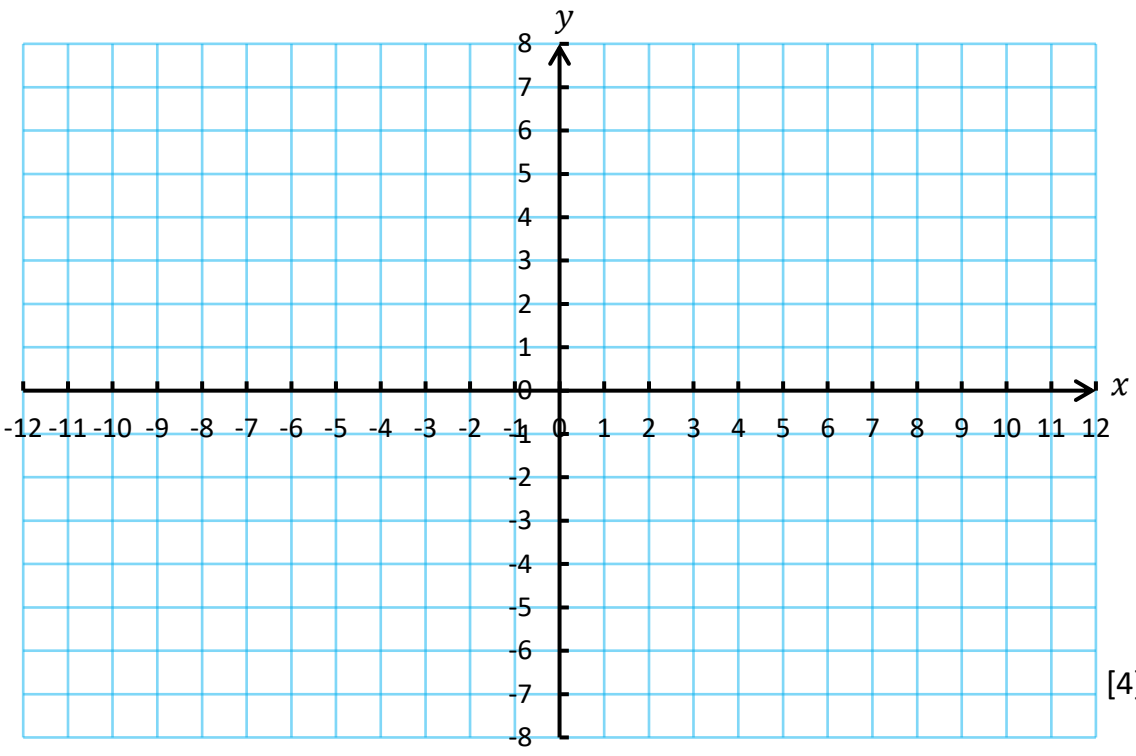

[4]

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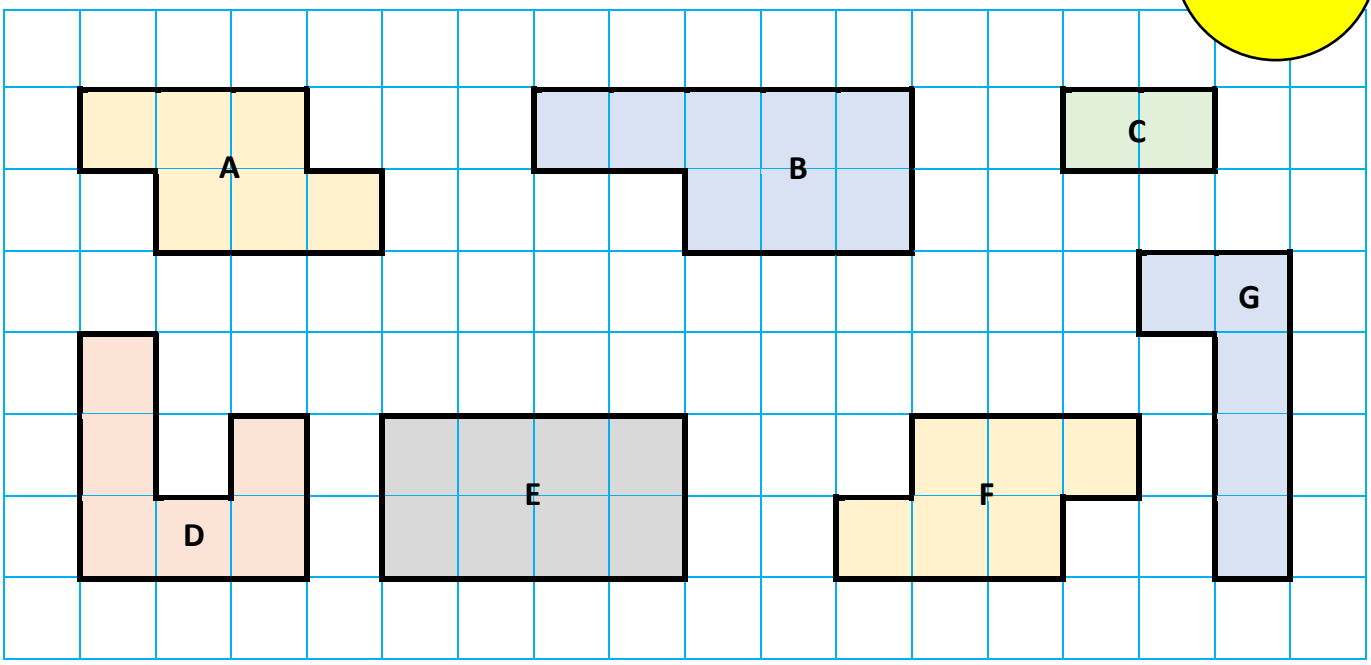
Pop Quiz: Congruent Shapes

Name: .....

/11

(1) Below is a collection of shapes drawn on a squared centimetre grid.



(a) Which two shapes are congruent? .....

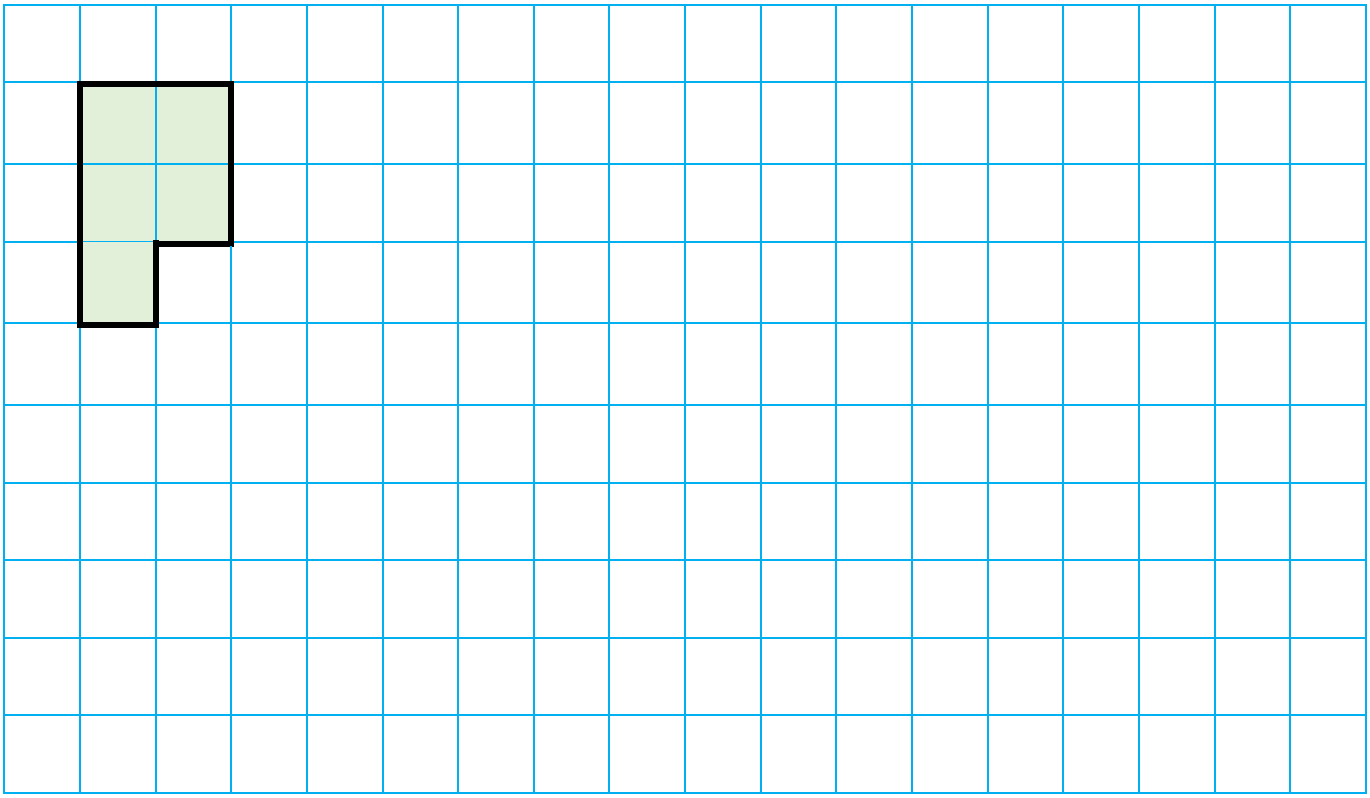
(b) Which two shapes are similar? .....

(c) Which two shapes have a perimeter of 14 cm? .....

(d) Which three shapes have an area of 6 cm²? .....

[4]

(2) On the following grid, draw the seven shapes that are congruent to the shown shape, but have different orientations.



[7]

Pop Quiz: Congruent Triangles Proofs

Name: .....

/16

(1) Circle the correct proofs.

(a) Side, Angle, Side (SAS)

(b) Side, Side, Side (SSS)

(c) Angle, Angle, Angle (AAA)

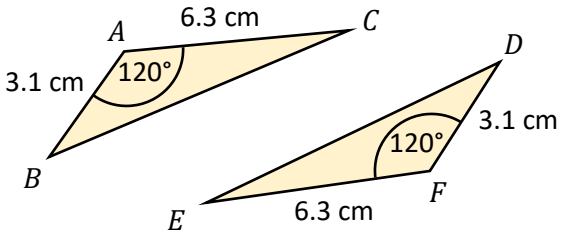
(d) Angle, Side, Angle (ASA)

(e) Right Angle, Hypotenuse, Side (RHS)

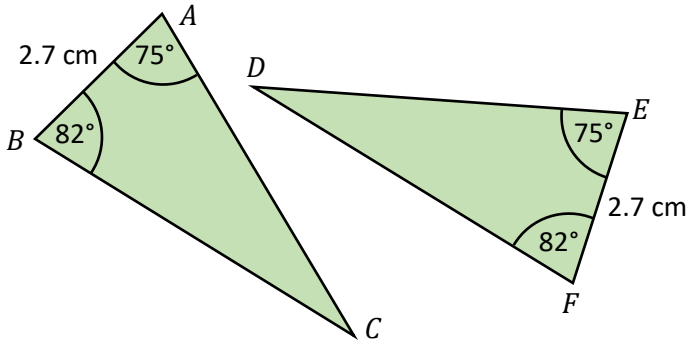
(f) Angle, Side, Side (ASS) [4]

(2) Explain, noting your reasons, if the following pairs of triangles are congruent or not.

(a)



(b)



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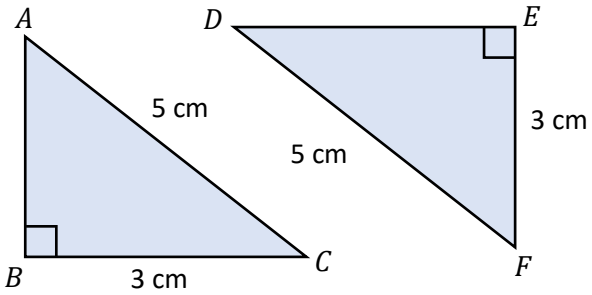
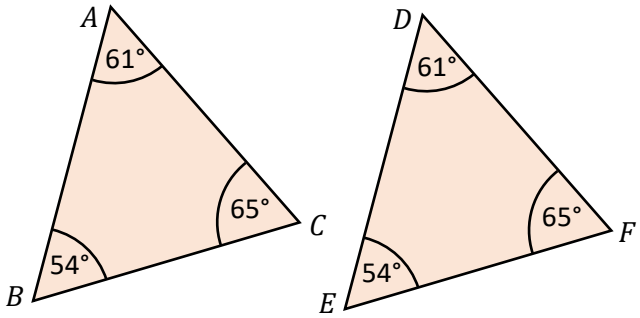
(c)



(d)



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..... [12]

Pop Quiz: Angles in Polygons

Name: .....

(1) What is the name of any shape with **7** sides? ..... [1]

(2) (a) What is the total of the interior angles of any **hexagon**?

.....

.....

.....

(b) What is the size of each angle in a **regular hexagon**?

.....

[3]

(3) Complete the following sentences with the correct angles.

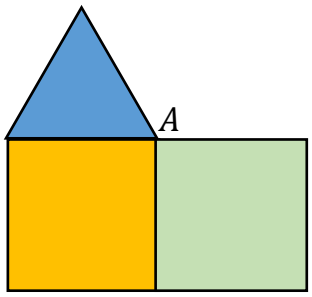
(a) The sum of the **exterior angles** of any polygon is .....°

(b) The sum of the **interior angles** of any **quadrilateral** is .....°

(c) For any vertex in a polygon, **interior angle + exterior angle** = ...°

[3]

(4) Gwen places two squares and one equilateral triangle together at a point A, as shown on the right. Which **two regular shapes** would be able to be placed at A in order to fill the gap?



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..... [2]

(5) The size of three of the exterior angles of a quadrilateral are 110°, 20° and 80°.

(a) What is the size of the other exterior angle? .....

.....

(b) What is the size of the interior angle near the exterior angle of 110°? .....

.....

[4]

(6) The diagram on the right shows a polygon.

(a) What is the name of the polygon? .....

(b) What is the size of the angle a?

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(c) What is the size of the angle b?

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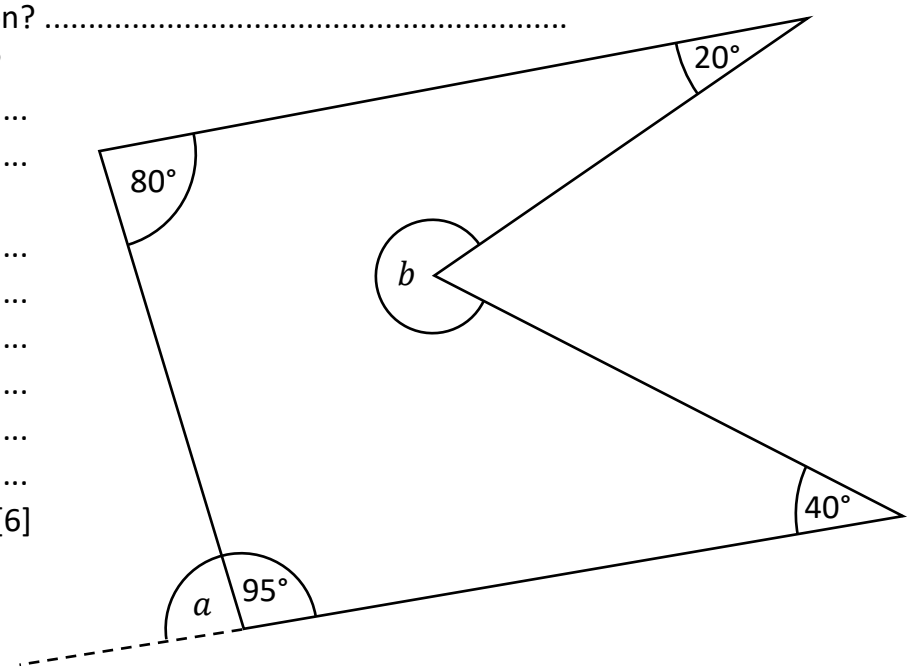
[6]



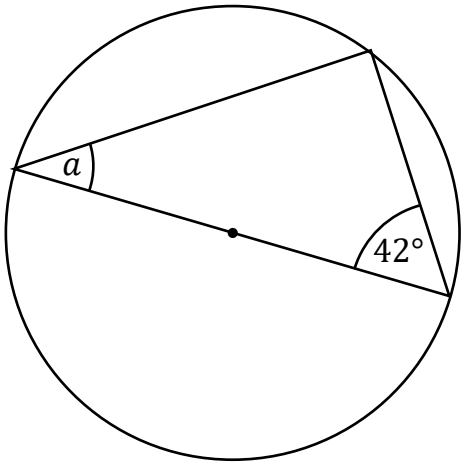
/19

Pop Quiz: Circle Theorems Name: .....

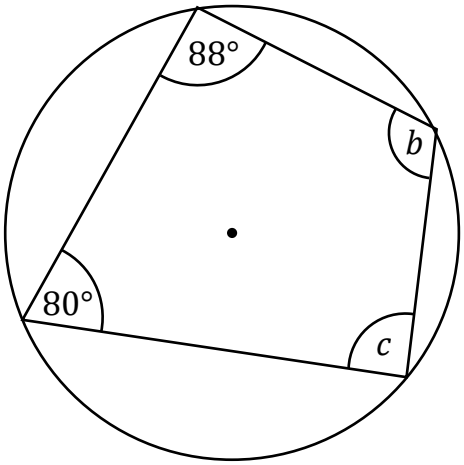
/8

(1) Use the circle theorems to find the size of the marked angles in the following diagrams. (The diagrams are not drawn to scale.)

(a)

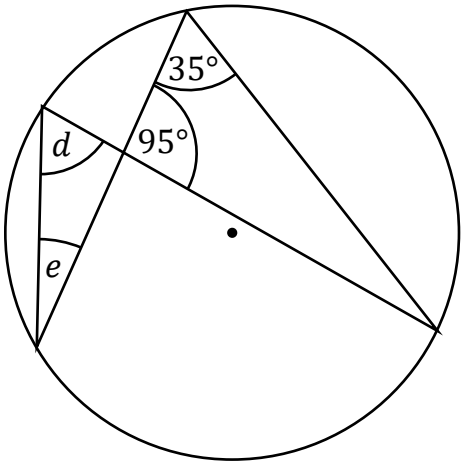


(b)

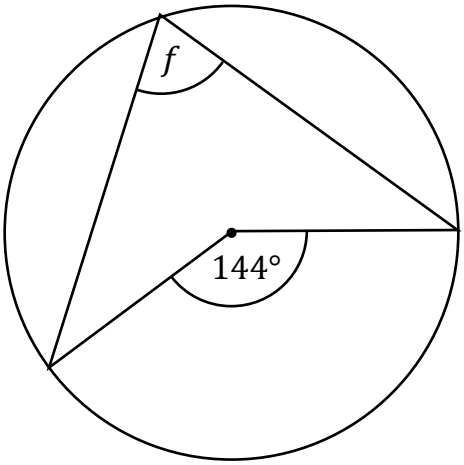


a = ... b = ... c = ...

(c)

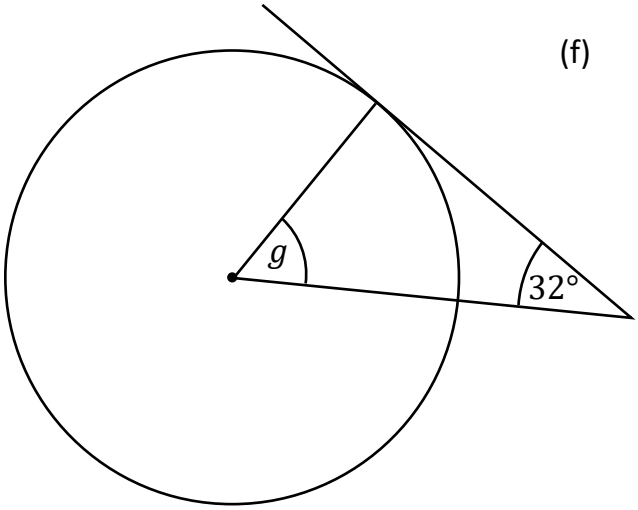


(d)

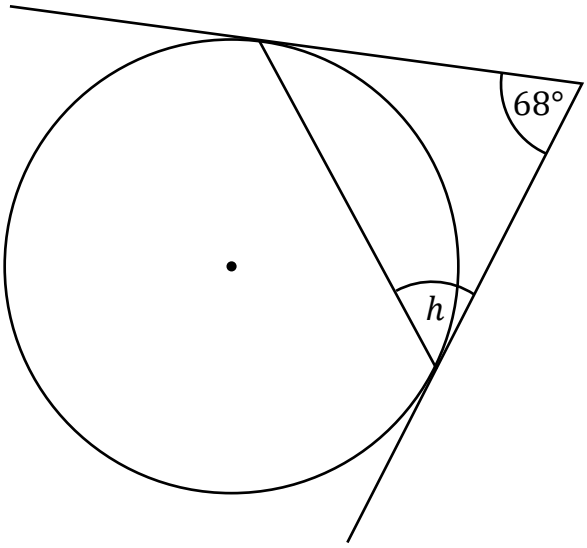


d = ... e = ... f = ...

(e)



(f)

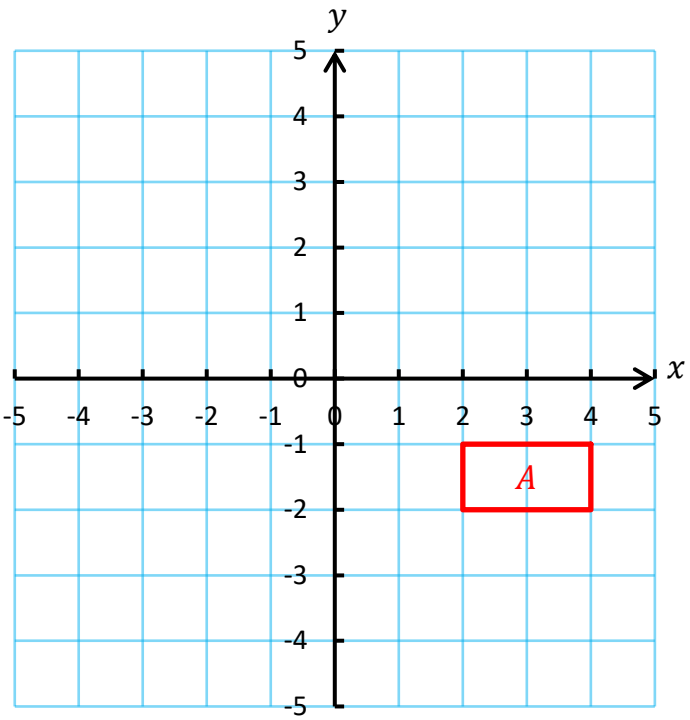


g = ... h = ...

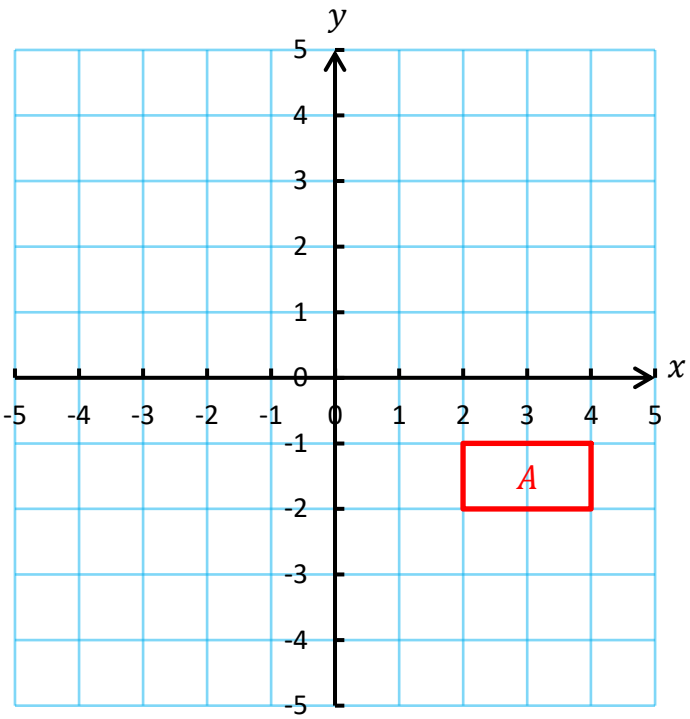
Pop Quiz: Transformations

Name: .....

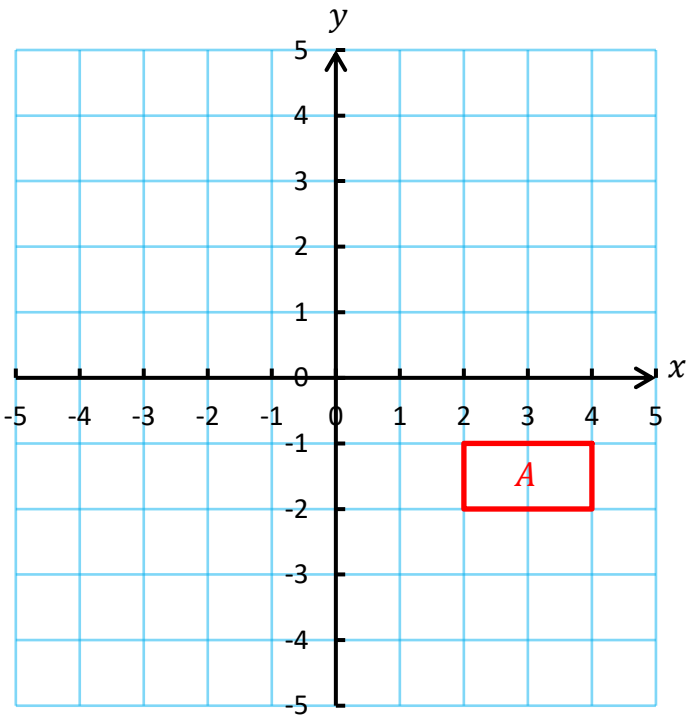
(1) (a) Translate the rectangle A 5 units to the left, 4 units up. [1]



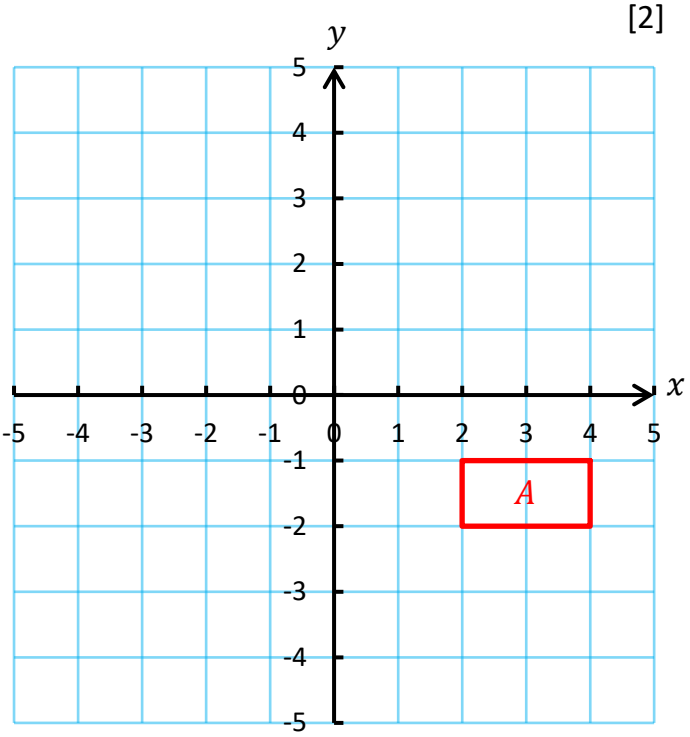
(b) Rotate the rectangle A 90° anticlockwise around the point (1, 0). [2]



(c) Reflect the rectangle A in the line $x = 1$. [2]



(d) Enlarge the rectangle A using scale factor 2 and centre of enlargement (5, –4). [2]



/7

Pop Quiz: Relative Frequency

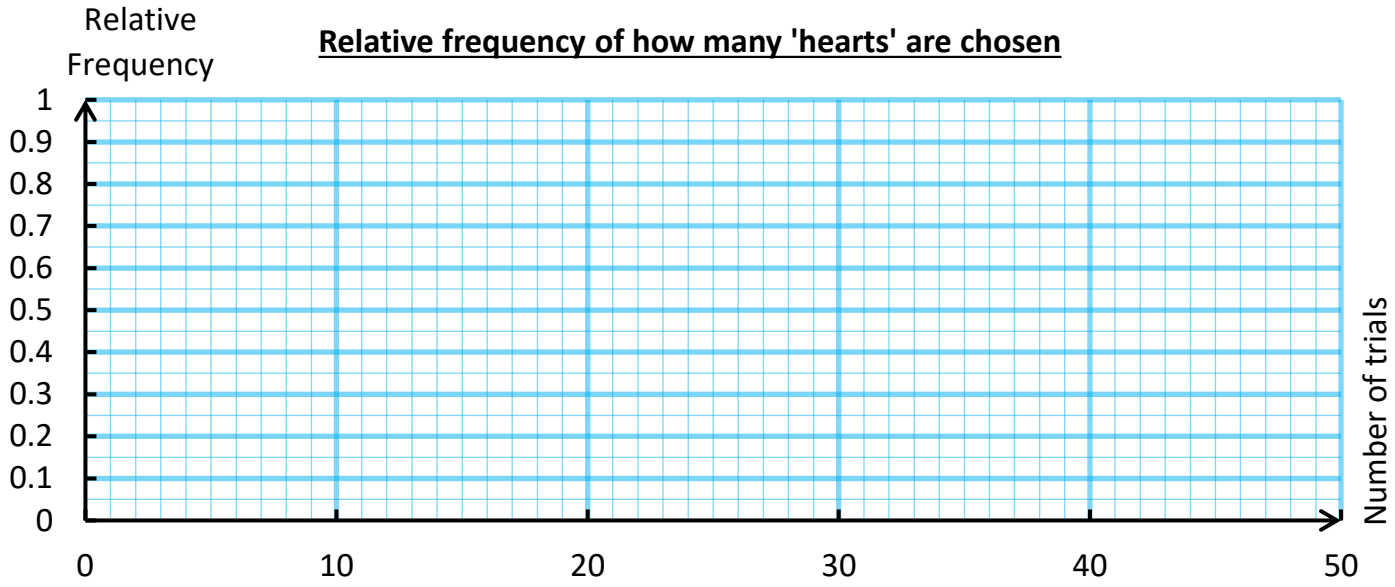
Name: .....

(1) Jack shuffles the 52 cards in a normal pack of playing cards and chooses one card from the pack at random. He repeats this 40 times, replacing the card in the pack each time.

(a) Complete the following table. [3]

Total number of trials	Number of hearts in these 10 trials	Total number of hearts so far	Relative frequency of the number of hearts, as a fraction	Relative frequency of the number of hearts, as a decimal
10	3		$\frac{}{10}$	
20	5		$\frac{}{20}$	
30	1		$\frac{}{30}$	
40	2			

(b) Plot, on the graph paper below, a line graph showing what happens to the relative frequency as the number of trials increases. [2]



(c) Write down the best estimate for the probability that one card, chosen randomly from Jack's pack, is a heart. You must give a reason for your answer.

.....

..... [2]

(d) Do you believe that Jack carried out the experiment fairly? Explain your answer.

.....

..... [1]

(e) Jack goes on to complete another 10 trials. The relative frequency of hearts, after these 10 new trials, is 0.28.

(i) How many hearts did Jack obtain in the first 50 trials?

.....

..... [2]

(ii) How many hearts did Jack obtain in the final 10 trials?

..... [1]

/11

Pop Quiz: Combined Events

Name: .....

/17

(1) Connect the following pairs.

Independent Events	The events cannot happen together
Mutually Exclusive Events	The result of one event affects another event
Dependent Events	The result of one event does not affect another event

[3]

(2) One number is chosen at random from the grid on the right.
What is the probability that the number is:

1	2	3
4	5	6
7	8	9
10	11	12
13	14	15

(a) Even? .....

(b) A multiple of 3 or a multiple of 7? .....

(c) A multiple of 4 or a multiple of 6? .....

(d) A square number or a prime number? .....

(e) A two-digit number or a cube number? .....

(f) A factor of 48? .....

[6]

(3) In a questionnaire, someone asked 30 adults if they enjoyed listening to music or going to the theatre.

25 people enjoyed listening to music.
23 people enjoyed going to the theatre.
20 people enjoyed doing both.

(a) Draw a Venn diagram showing this information. [6]

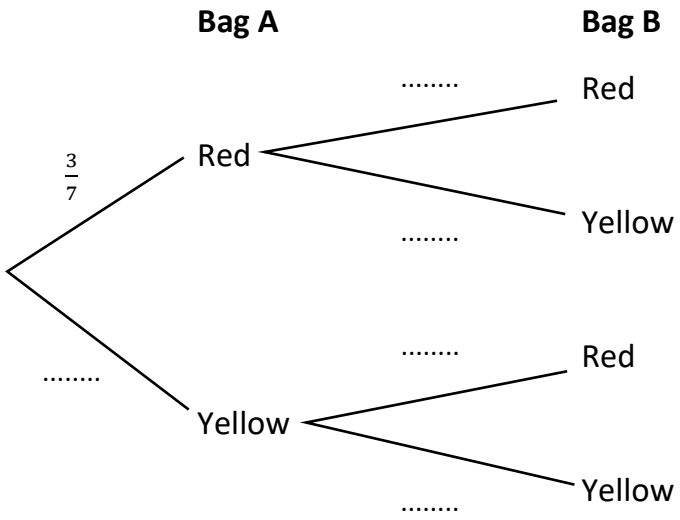
(b) What is the probability that a randomly chosen adult from this group
(i) likes listening to music only? .....
(ii) does not like listening to music or going to the theatre? ..... [2]

Pop Quiz: Tree Diagrams

Name: .....

(1) There are two bags in a game, and both bags contain coloured balls.
Bag A contains 3 red balls and 4 yellow balls.
Bag B contains 4 red balls and 2 yellow balls.
A player randomly chooses one ball from each bag.

(a) Complete the following tree diagram.



[3]

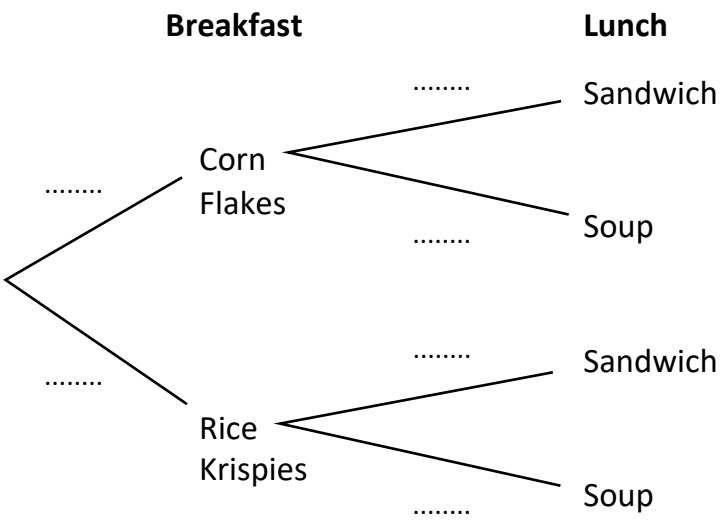
(b) Find the probability of choosing two yellow balls. ..... [1]

(c) Find the probability of choosing a ball of each colour. ..... [2]

(d) Find the probability of not choosing two red balls. ..... [2]

(2) Siwan always has Corn Flakes or Rice Krispies for breakfast, and then (independently) a sandwich or soup for lunch. The probability that she has Corn Flakes for breakfast is 0.6.
The probability that she has Rice Krispies for breakfast and then a sandwich for lunch is 0.28.

(a) Complete the following tree diagram. [4]



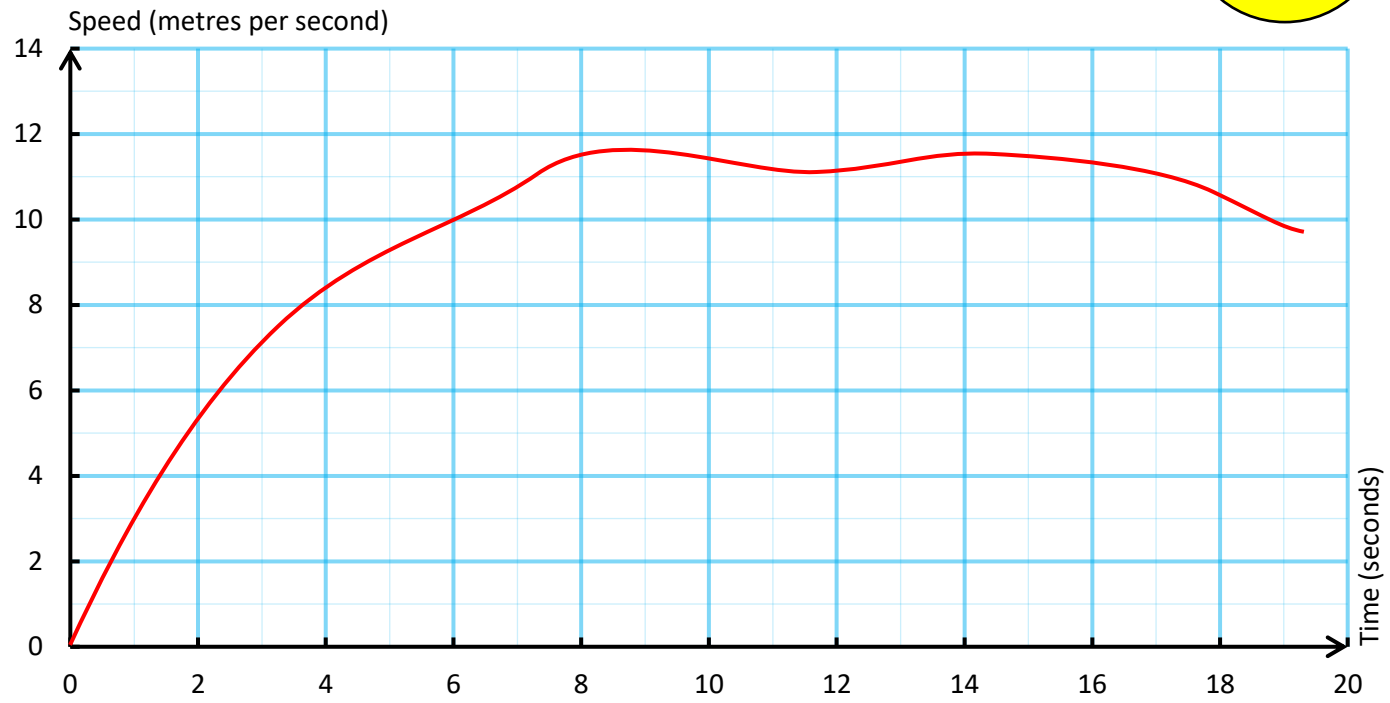
(b) Find the probability that Siwan has Corn Flakes for breakfast and then soup for lunch. ..... [2]

/14

Pop Quiz: Pre-Calculus Name: .....

/10

(1) The graph below estimates Michael Johnson's speed whilst setting a world record running 200 m in 19.32 seconds in 1996.



(a) Write down an estimate for a time when Michael Johnson's acceleration was 0 m/s². [1]

.....

(b) Find an estimate for Michael Johnson's acceleration at time 6 seconds. [3]

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(c) Use the trapezium rule, with ordinates $t = 0$, $t = 2$, $t = 4$, $t = 6$, $t = 8$ and $t = 10$, to estimate how much of the 200 m race Michael Johnson had completed after 10 seconds. [5]

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(d) State a possible reason why your answer to part (c) is less than half of the distance of the race, even though 10 seconds is more than half of Michael Johnson's time. [1]

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Pop Quiz: Further Changing the Subject Name: .....

/8

(1) Make x the subject of the formula $7x - 2 = xy + z$. [2]

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(2) Make y the subject of the formula $z = \frac{2}{x} + \frac{3}{y}$. [3]

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(3) Make g the subject of the formula $h + 2 = \sqrt{f - g}$. [3]

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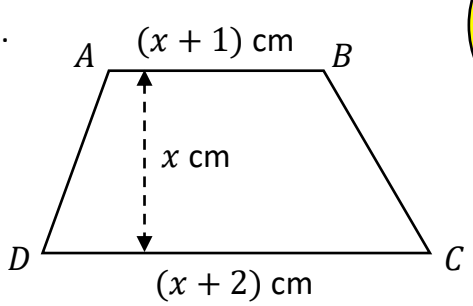
Pop Quiz: The Quadratic Formula

Name: .....

/7

(1) The area of the trapezium on the right is 25 cm².

(The diagram is not drawn to scale.)



(a) Show that $2x^2 + 3x - 50 = 0$. [3]

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(b) Solve the equation $2x^2 + 3x - 50 = 0$ to find the lengths AB and DC.

Give your answers correct to 2 decimal places. [4]

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Pop Quiz: Algebraic Fractions Name: .....

/9

(1) Write $\frac{2}{x+3} + \frac{4}{x-2}$ as a single fraction, in its simplest form. [4]

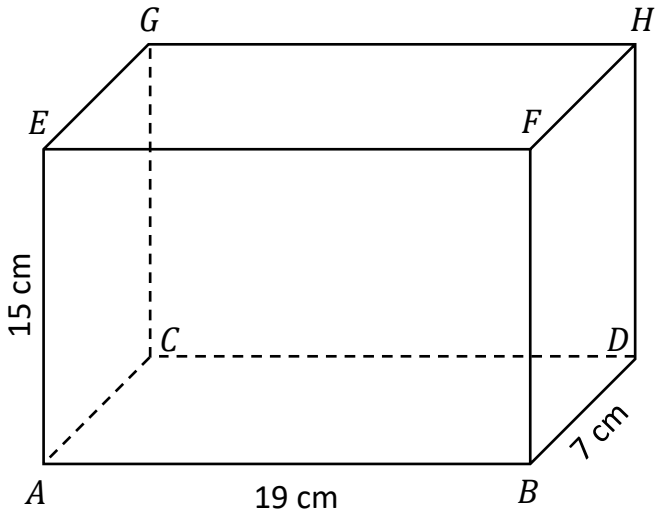
(2) Solve the equation $\frac{x}{x+1} = \frac{2}{4x-5}$. [5]

Pop Quiz: 3-D Trigonometry Name: .....

(1) The diagram on the right shows a cuboid.

(a) Calculate the size of the angle $A\hat{C}E$. [3]

(b) Calculate the size of the angle $C\hat{G}B$. [6]



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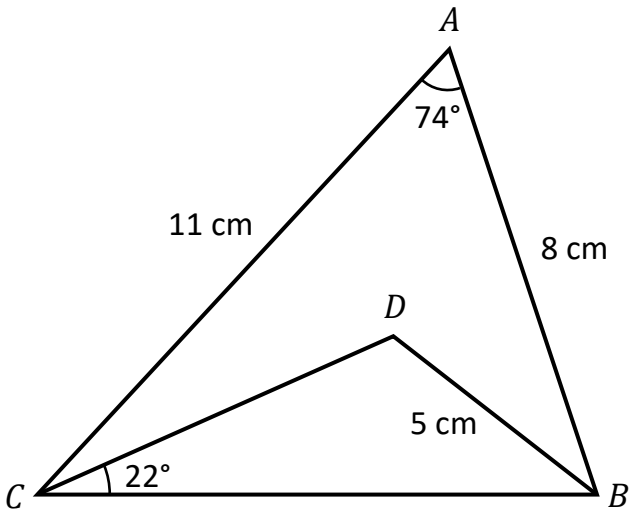
Pop Quiz: The Sine Rule, The Cosine Rule

Name: .....

(1) Pair the following with each other. [2]

$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$	The Cosine Rule for finding lengths
$a^2 = b^2 + c^2 - 2bc\cos A$	The Cosine Rule for finding angles
$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$	The Sine Rule for finding lengths
$\cos A = \frac{b^2+c^2-a^2}{2bc}$	The Sine Rule for finding angles

(2) Calculate the size of the angle $C\hat{D}B$. [6]



/8

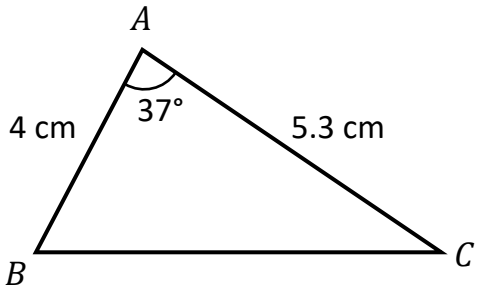
Pop Quiz: Area of a Triangle

Name: .....

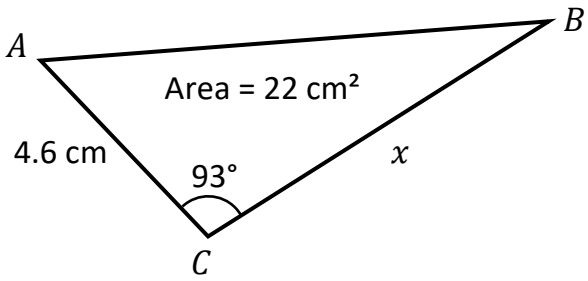
(1) Imagine a triangle with vertices A, B, C.
Circle the formulae below that could be used to calculate the area of the triangle. [3]

$\frac{1}{2}ab\sin C$ $\frac{1}{2}ac\sin A$ $\frac{1}{2}bc\sin A$ $\frac{1}{2}cb\sin A$ $\frac{1}{2}ac\sin D$ $\frac{1}{2}ac\sin B$ $\frac{\text{base}\times\text{height}}{2}$

(2) Calculate the area of the triangle below. [3]



(3) Calculate the missing length x. [3]



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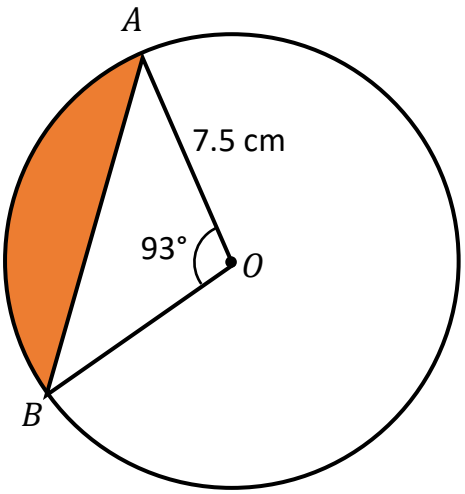
(4) Calculate the area of the least segment AB. [6]



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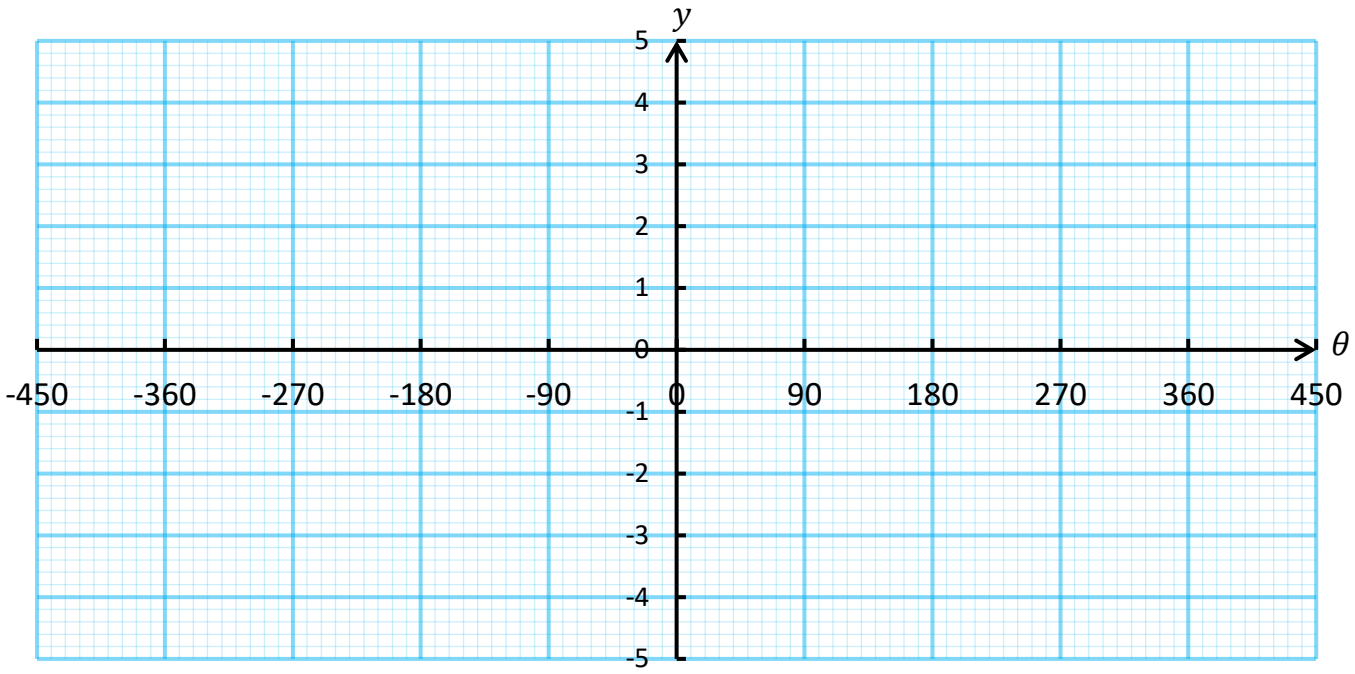
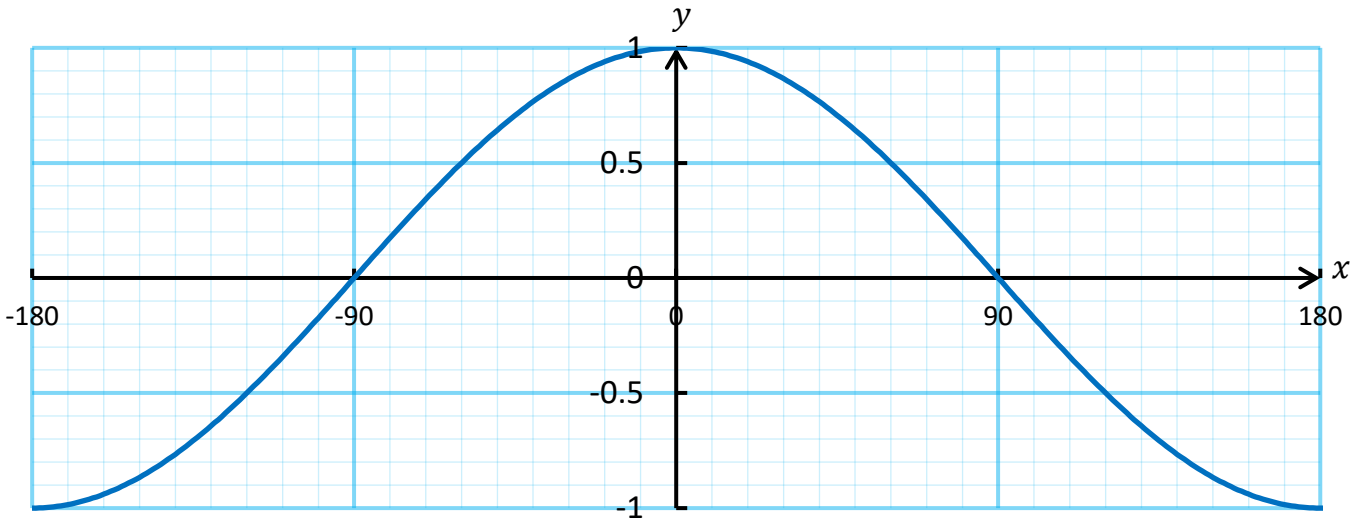
Pop Quiz: Trigonometric Graphs

Name: .....

(1) On the graph paper below, sketch the graphs of $y = \sin\theta$, $y = \tan\theta$.
Remember to show any asymptotes as dotted lines. [4]



(2) The diagram below shows a sketch of $y = \cos x$ for values of x between –180° and 180°.



(a) Calculate all the solutions of $\cos x = -0.766$ between –180° and 180°. [2]

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(b) On the axes above, sketch the graph of $y = \cos(x - 20°)$
for values of x between –180° and 180°. [2]

/8

Pop Quiz: Trial and Improvement Name: .....

/6

(1) Find the whole number that satisfies the equation $x^2 + 8x = 345$. [2]

(2) There is a solution to the equation $x^3 + 8x - 5 = 0$ between 0 and 10.
Find this solution correct to one decimal place. [4]

Pop Quiz: AER, APR Name: .....

(1) Lois intends to invest £4,000 into a savings account for one year. HSBC bank offer a nominal interest rate of 3.6% a year, with interest to be paid every three months.

(a) Calculate the AER for HSBC's offer. Give your answer correct to two decimal places. [4]

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(b) If Lois chooses to invest her money with HSBC for one year, how much money will be in her account at the end of the year? [2]

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(2) Elis intends to borrow £12,000 from the company BestLoan. The company offers an interest rate of 3.5% a month, and charges a monthly fee of £10 to use the account.

(a) How much interest will this loan accrue over a period of one year? [3]

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(b) Calculate the APR for this loan. [3]

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