

Name:	School:	Target Grade:
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**MOCK EOY PAPER 2025
SECONDARY 2 MATH**

READ THESE INSTRUCTIONS FIRST

INSTRUCTIONS TO CANDIDATES

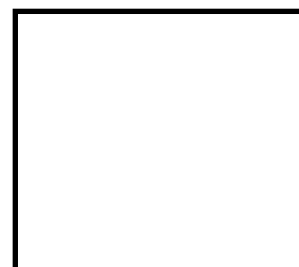
1. Find a nice comfortable spot without distraction.
2. Be fully focused for the whole duration of the test.
3. Speed is KING. Finish the paper as soon as possible then return-back to Check Your Answers.
4. As you are checking your answers, always find ways to VALIDATE your answer.
5. Avoid looking through line by line as usually you will not be able to see your Blind Spot.
6. If there is no alternative method, cover your answer and REDO the question.
7. Give non-exact answers to 3 significant figures, or 1 decimal place for angles in degree, or 2 decimal place for \$\$\$, unless a different level of accuracy is specified in the question.

Wish you guys all the best in this test.

You can do it.

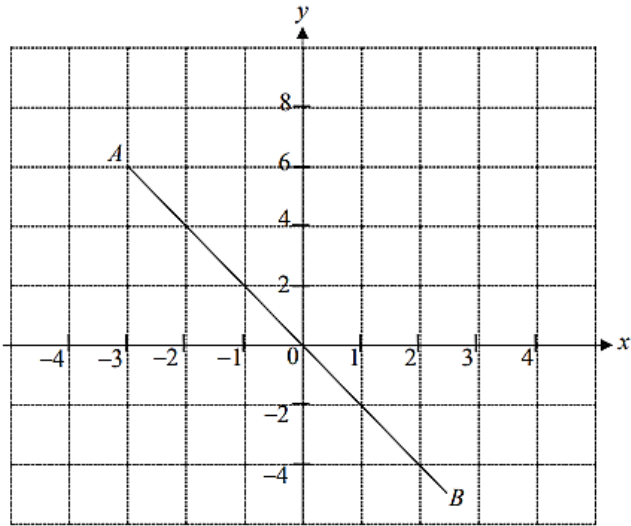
I believe in you.

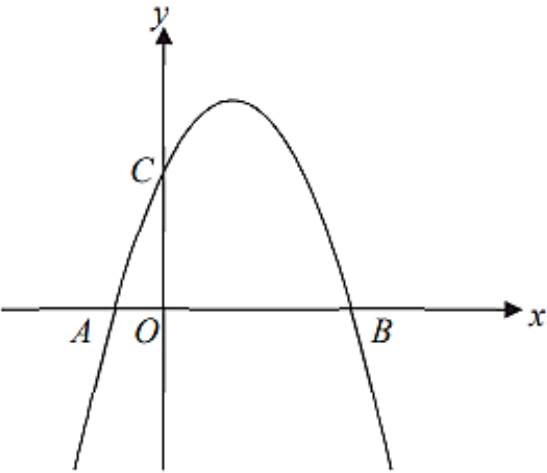
Team Paradigm

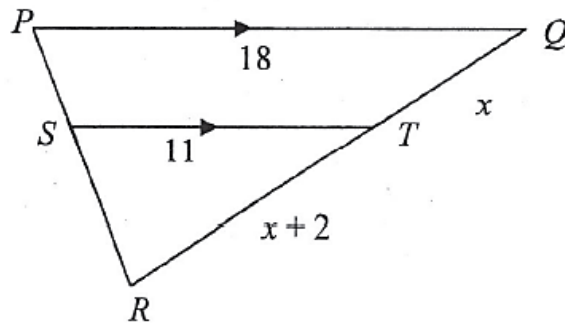


PARADIGM

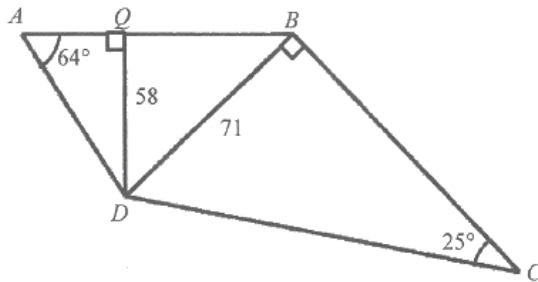
[Turn Over]

1	[Simultaneous Equation] Solve the simultaneous equations. $\frac{x}{3} - \frac{3y}{4} = 2$ $4x + 3y = 16$	[3]
2	[Linear Graph] The diagram shows a line segment AB . 	
	(a) Find the gradient of the line AB .	[1]
	(b) State the equation of the line that is parallel to the y -axis and passes through the point A .	[1]
	(c) Draw and label a line l_1 that has a zero gradient and a y -intercept of -4 .	[1]
3	[Expansion] (a) Simplify $x^2 - (x - 1)^2 + (x - 2)^2 - (x - 3)^2$. (b) Hence, find the value of $2020^2 - 2019^2 + 2018^2 - 2017^2$.	[2] [2]
4	[Factorisation] Factorise fully (a) $8x^2 - 2$, (b) $15a^2 - 5ab + 2b - 6a$.	[2] [2]
5	[Changing Subject Formula] Make x the subject of the formula. $y = \sqrt{\frac{4x}{px-1}}$	
6	[Algebraic Fraction] (a) Simplify $\frac{5a^2b}{7c} \div \frac{15b^2a}{4c^3}$. (b) Express $\frac{3y}{(y-2)^2} + \frac{3}{4-2y}$ as a single fraction in its simplest form.	[2] [3]

7	[Quadratic Equation] (a) Solve $2x^2 + 15x - 8 = 0$. (b) Hence, solve the equation $2(p - 1)^2 + 15(p - 1) - 8 = 0$.	[2] [2]
8	[Quadratic Equation - Application] Rio cycled for 30 km at a constant speed of x km/h. He then ran for the remaining 8 km at a constant speed of $(x - 15)$ km/h. (a) Write down an expression, in terms of x, for the time in hours that Rio cycled. (b) Write down an expression, in terms of x, for the time in hours that Rio ran. (c) Given that the total time taken for the whole training is 2 hours, form an equation in x and show that it reduces to $x^2 - 34x + 225 = 0$. (d) Solve the equation $x^2 - 34x + 225 = 0$. (e) Explain why one of the solutions in (d) is not a possible solution. (f) Find the time taken, in hours and minutes that Rio cycled.	[1] [1] [3] [2] [1] [1]
9	[Quadratic Equation - Sketching] The curve $y = 3 + 2x - x^2$ cuts the x-axis at two points A and B, and the y-axis at C.  Find (i) the coordinates of A and C, (ii) the equation of the line of symmetry.	[2] [1]

10	[Coordinate Geometry] The variables of x and y are connected by the equation $y = -x^2 + 14x - 24$. Some corresponding values of x and y are given in the table below. <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>4</td><td>6</td><td>8</td><td>10</td><td>12</td></tr><tr><td>y</td><td>-24</td><td>-11</td><td>0</td><td>16</td><td>24</td><td>p</td><td>16</td><td>0</td></tr></table> (a) Calculate the value of p. (b) On the grid opposite, draw the graph of $y = -x^2 + 14x - 24$ for $0 \leq x \leq 12$. (c) State the equation of the line of symmetry for $y = -x^2 + 14x - 24$. (d) From the graph, find the value of y when $x = 1.5$. (e) By drawing a tangent, find the gradient of the curve at the point $(6, 24)$. (f)(i) On the same axes, draw the graph of $y = 2x - 4$ for $0 \leq x \leq 12$. (ii) Write down the x-coordinates of the points where this line intersects the curve.	x	0	1	2	4	6	8	10	12	y	-24	-11	0	16	24	p	16	0	[1] [3] [1] [1] [2] [2] [1]
x	0	1	2	4	6	8	10	12												
y	-24	-11	0	16	24	p	16	0												
11	[Direct Proportion] P is directly proportional to the square of r and $P = 200$ when $r = 5$. (a) Express the P in terms of r. (b) When r is increased by 300% , find the percentage increase in P.	[3]																		
12	[Maps and Scale] The scale of a map is 1: 80 000. (a) The length of a river is 5400 m. Find the length, in centimetres, of the river on this map (b) The area of a town on the map is 105 cm^2. Find the actual area, in square kilometres, of the town.	[2] [2]																		
13	[Congruent & Similar Triangle] The diagram below, which is not drawn to scale, shows PQ is parallel to ST. It is given that $PQ = 18 \text{ cm}$, $ST = 11 \text{ cm}$, $TQ = x \text{ cm}$ and $RT = (x + 2) \text{ cm}$.  (a) State a triangle that is similar to ΔSRT. (b) Hence, find the value of x.	[1] [2]																		

14 **[Pythagoras Theorem and Trigonometry]**



The diagram shows a field $ABCD$.

Q is on AB such that DQ is perpendicular to AB .

$DQ = 58$ m, $DB = 71$ m, angle $DAQ = 64^\circ$, angle $DBC = 90^\circ$ and angle $BCD = 25^\circ$.

Calculate

- (a) QB ,
- (b) AB ,
- (c) the shortest distance from B to DC .

[2]

[2]

[2]

15 **[Statistics]**

The stem-and-leaf diagram shows the test results of a class of students.

0	2					
1	8					
2	3	5	7	8		
3	1	2	4	4	4	8
4	0	5	5			

Key: 1 | 8 means 18 marks

Find

- (a) (i) the modal mark,
- (ii) the median mark.
- (b) Is the mean or median, a better representation of the subject ability of the class? Explain your answer.
- (c) A new student joined the class and took the same test.
The new mean mark for the class is 30.
Find the mark of the new student who joined the class.

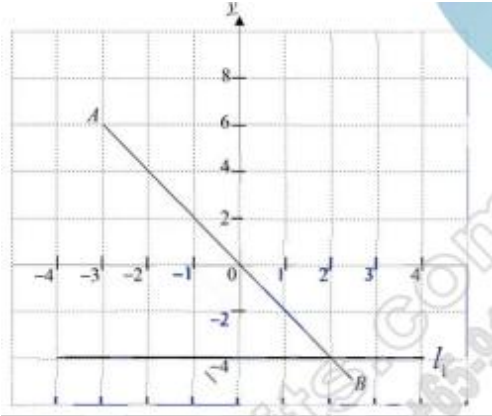
[1]

[1]

[1]

[1]

Answer Key

1	$y = -\frac{2}{3}$ $x = 4\frac{1}{2}$	
2	(a) Gradient of the line $AB = -2$ (b) $x = -3$ (c) 	
3	$x^2 - (x^2 - 2x + 1) + x^2 - 4x + 4 - (x^2 - 6x + 9)$ $= 2x - 1 - 4x + 4 + 6x - 9$ $= 4x - 6$ or $(x - x + 1)(x + x - 1) + (x - 2 - x + 3)(x - 1 + x - 3)$ $= 2x - 1 + 2x - 5$ $= 4x - 6$ $4(2020) - 6 = 8074$	
4	(a) $2(2x - 1)(2x + 1)$ (b) $(5a - 2)(3a - b)$	
5	$x = \frac{y^2}{py^2 - 4}$ $y^2 = \frac{4x}{px - 1}$ $pxy^2 - y^2 = 4x$ $pxy^2 - 4x = y^2$ $x(py^2 - 4) = y^2$ $x = \frac{y^2}{py^2 - 4}$	
6	(a) $\frac{4ac^2}{21b}$ (b) $\frac{3y+6}{2(y-2)^2}$	

7	(a) $x = \frac{1}{2}$ or $x = -8$ (b) $p = 1\frac{1}{2}$ or $p = -7$	
8	(a) $\frac{30}{x}h$ (b) $\frac{8}{x-15}h$ (c) $\frac{30}{x} + \frac{8}{x-15} = 2$ $\frac{30(-15)+8x}{x(x-15)} = 2$ $\frac{30x-450+8x}{x(x-15)} = 2$ $\frac{30-450}{x(x-15)} = 2$ $38x - 450 = 2x^2 - 30x$ $2x^2 - 30x - 38x + 450 = 0$ $2x^2 - 68x + 450 = 0$ $x^2 - 34x + 225 = 0$ (d) $x = 25$ or $x = 9$ (e) When $x = 9$, $9 - 15 = -6$ hence the running speed will be negative which is not possible. Therefore, $x = 9$ is not a possible solution. (f) Time taken by Rio cycle = 1 hour and 2 minutes	
9	(a)(i) $A(-1,0); C(0,3)$ (ii) $x = 1$	
10	(a) $p = 24$ (b) Graph Drawn (c) $x = 7$ (d) $y = -511$ (e) Gradient = $2\frac{11}{32}$ (f)(i) refer to graph (ii) $x = 2$ and $x = 10$	
11	(a) $P = 8r^2$ $P = kr^2$ $P = 8r^2$ (b) Percentage increase = 1500% $P_{new} = 8(4r)^2$ $= 16V$ Percentage increase $= \frac{16P-P}{P} \times 100$ $= 1500\%$	

12	(a) Lengths of river on the map = 6.75 cm (b) Actual area of the town is 67.2 km²	
13	(a) ΔPRQ $\frac{x+2}{2x+2} = \frac{11}{18}$ $18(x+2) = 11(2x+2)$ $18x + 36 = 22x + 22$ $4x = 14$ $x = 3.5$	
14	(a) 41.0 m $QB = \sqrt{71^2 - 58^2}$ $QB = 40.951$ $QB = 41.0 \text{ m}$ (b) $AB = 69.2 \text{ m}$ $\tan 64^\circ = \left(\frac{58}{AQ}\right)$ $AQ = \frac{58}{\tan 64^\circ}$ $AQ = 28.288$ $AQ = 28.3 \text{ m}$ $AB = 25.288 + 40.951$ $AB = 69.239$ $AB = 69.2 \text{ m}$ (c) $h = 64.3 \text{ m}$ $\angle BDC = 180^\circ - 90^\circ - 25^\circ$ $= 65^\circ$ $\sin 65^\circ = \frac{h}{71}$ $h = 71 \times \sin 65^\circ$ $h = 64.347$ $h = 64.3$	
15	(a)(i) 34 (ii) Position = $(15 + 1) \div 2 = 8\text{th}$ Median = 32 (b) The <u>median</u> would be a better representation on the spelling ability of the class because <u>the mean will be affected by 1 extreme value (2 marks) in the data.</u> (c) $(16 \times 30) - 456 = 24$	