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**MOCK EOY PAPER 2025
SECONDARY 1 MATH EOY**

READ THESE INSTRUCTIONS FIRST

INSTRUCTIONS TO CANDIDATES

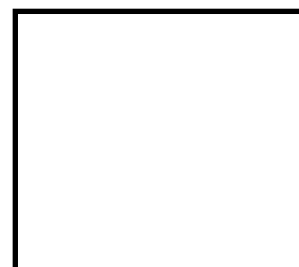
1. Find a nice comfortable spot without distraction.
2. Be fully focused for the whole duration of the test.
3. Speed is KING. Finish the paper as soon as possible then return-back to Check Your Answers.
4. As you are checking your answers, always find ways to VALIDATE your answer.
5. Avoid looking through 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.

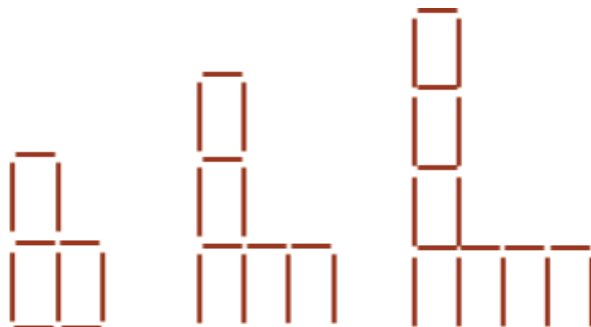
Team Paradigm

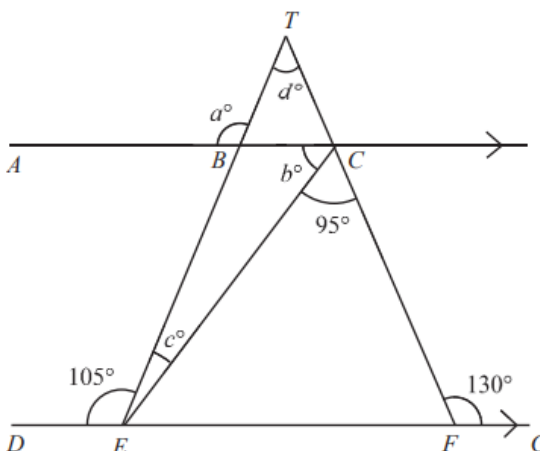
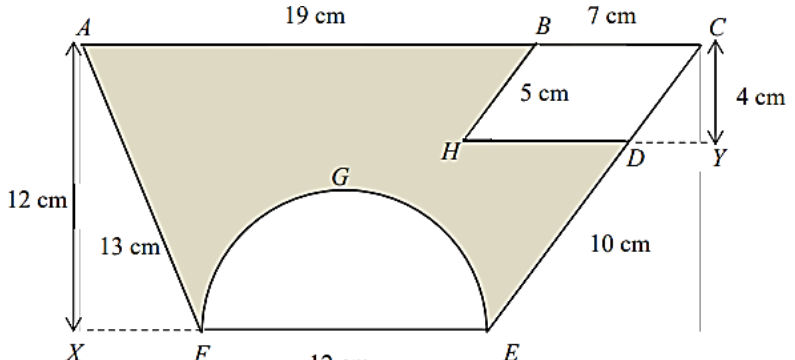


PARADIGM

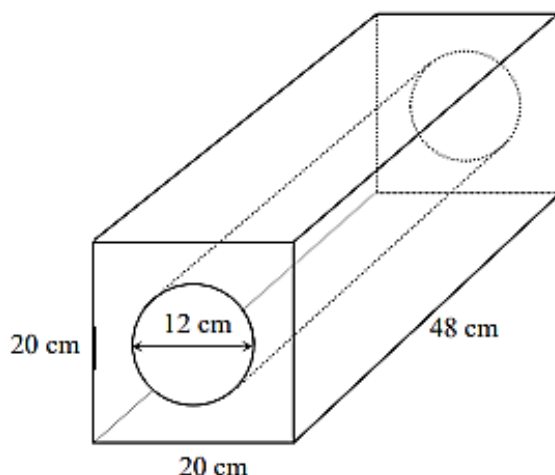
[Turn Over]

1	[Numbers] Consider the following set of numbers. $29, \quad \sqrt{5}, \quad \frac{3\pi}{2}, \quad 1, \quad 0.\dot{2}\dot{3}, \quad 7^3, \quad \sqrt{16}, \quad 9$ Write down all (a) the irrational number(s), (b) the prime number(s), (c) the perfect square(s),	[1] [1] [1]
2	[Approximation & Estimation] Express (a) 10.0945 correct to 2 decimal places. (b) 20 947 correct to 3 significant figures. (c) Estimate the value of $\frac{12.46 - \sqrt{9.23}}{1.01 + 3.84}$ by writing each number correct to 1 significant figure. Show your working clearly.	[1] [1] [2]
3	[HCF & LCM] (a) Find the highest common factor of 1428 and 2660. (b) Find the lowest common multiple of $2^6 \times 3^2 \times 5^{15}$ and $2^5 \times 3^3 \times 7$. Leave your answer in index notation form. (c) Using prime factorisation, find $\sqrt{2304}$. Show your working clearly. (d) Find the smallest integer value of k where $168k$ is a perfect square.	[1] [1] [2] [2]
4	[Number Operations] Evaluate the following without using calculator. Show your working clearly. (a) $2 - (-3) - 5 \times 5 \div (10 - 15)^2$ (b) $3\frac{3}{5} + (-2) - \left(\frac{2}{3} + \frac{5}{6}\right) \div 1\frac{1}{6}$	[2] [3]
5	[Algebra] (a)(i) Given that $a = 5, b = -3, c = -1$, find the value of $ac^2 - 4b^2$. (ii) Given that $d = -\frac{1}{3}, e = \frac{5}{7}, f = \frac{3}{8}$, find the value of $\frac{de-5f}{def}$. (b) Expand the following algebraic expressions. (i) $-5(2b - \frac{7}{5})$. (c) Factorise the following completely. (i) $2a - 14a^2b + 22ab^2$ (d) Express $\frac{2(x+3)}{5} - \frac{3(x-2)}{4}$ as a single fraction in its simplest form.	[1] [1] [1] [1] [3]

6	[Number Patterns] (a) Fill in the next two terms of the number sequences. (i) $-3, -1, 1, 3, 5, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \dots$ (ii) $-6, -10, -18, -34, -66, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \dots$ (b) The diagram below shows the first three figures of a sequence of chopsticks.  Figure 1 Figure 2 Figure 3 (i) Find the number of chopsticks used in Figure 4. (ii) Find an expression for the n^{th} term. (iii) Hence, find the number of chopsticks used in the 200th term.	[1] [1] [1] [1] [1]												
7	[Percentage] (a) Find $66\frac{2}{3}\%$ of m if m is 78. (b) Find n if 160% of n is 280. (c) On a menu, the marked price of meal is \$$x$. Tommy was given a 17% discount from the marked price. After that, a 10% service charge was charged to his bill. Finally, a 7% Goods and Services Tax (GST) was charged to his bill. Find the amount he paid for his meal in terms of x.	[1] [1] [2]												
8	The table below shows the prices of three packs of batteries sold at a supermarket. <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"><tr><th></th><th>Pack A</th><th>Pack B</th><th>Pack C</th></tr><tr><td>Number of batteries in each pack</td><td>16</td><td>10</td><td>12</td></tr><tr><td>Price of each pack/\$</td><td>15.90</td><td>12.60</td><td>14.90</td></tr></table> Which pack of batteries has the best value for money? Show your working clearly.		Pack A	Pack B	Pack C	Number of batteries in each pack	16	10	12	Price of each pack/\$	15.90	12.60	14.90	[2]
	Pack A	Pack B	Pack C											
Number of batteries in each pack	16	10	12											
Price of each pack/\$	15.90	12.60	14.90											
9	[Speed] To celebrate Singapore's 55th. Holly ran 33 km in 250 minutes, rested for $\frac{1}{4}$ hour and ran 22 km in 2 hours. Find her average speed in kilometres per hour.	[2]												

10	[Polygon] (a) Four of the exterior angles of an octagon (eight-sided polygon) are 52° each. The remaining exterior angles are equal. Find the value of one of the remaining exterior angles. (b) Each interior angle of a regular polygon is 120°. How many sides does the polygon have?	[2] [2]
11	[Angle] In the diagram given below, ABC and DEF are parallel lines, and EBT and FCT are straight lines. $\angle DEB = 105^\circ$, $\angle ECF = 95^\circ$ and $\angle CFG = 130^\circ$. Find the values of a, of b, of c and of d. State your reasons clearly 	[4]
12	[Perimeter and Area of Composite Figures] In the figure given below, $ACEF$ is a trapezium, $BCDH$ is a parallelogram, EGF is a semicircle and AC is parallel to FE. It is given that $AB = 19$ cm, $BC = 7$ cm, $DE = 10$ cm, $EF = 12$ cm, $AF = 13$ cm, $BH = 5$ cm, $AX = 12$ cm and $CY = 4$ cm.  Find (a) the perimeter of the shaded figure, (b) the area of the shaded figure.	[2] [4]

13 **[Mensuration]**



The diagram shows a concrete slab of length 48 cm, width 20 cm and height 20 cm with a cylindrical hollow section of diameter 12 cm.

Find

- (a) the volume of the concrete slab.
(b) the total surface area of the concrete slab.

[3]

[3]

14 **[Linear Graph]**

A class of students in Paradigm wants to sell cupcakes for fund raising.

The profit, \$ y for selling x cupcakes is given by $y = 3x - 50$, for $0 \leq x \leq 60$.

The table shows some values of x and its corresponding values of y .

x	0	10	30	50	60
y	-50	p	40	100	q

- (a) Find the values of p and of q .
(b) On the graph paper opposite, using a scale of 2 cm to represent 10 cupcakes on the x -axis and 2 cm to represent \$20 on the y -axis, draw the graph of $y = 3x - 50$, for $0 \leq x \leq 60$.
(c) Use your graph to find
(i) the profit made when 45 cupcakes are sold.
(ii) the number of cupcakes that must be sold to make a profit of \$126.
(d) State the gradient of the graph and explain what the gradient represents.
(e) How many cupcakes must the students sell before they could start making a profit?

[2]

[3]

[2]

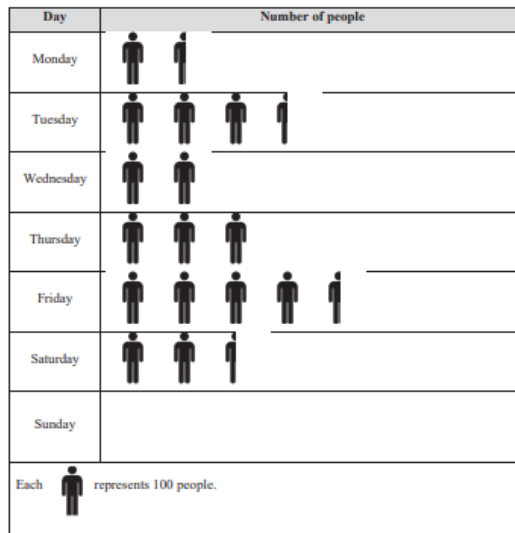
[2]

[2]

[2]

15 **[Statistics]**

The pictogram shows the number of people visiting a public library in a week.



(a) 250 people visited the library on Sunday.

[1]

Complete the pictogram to represent this data.

(b) Find the ratio of the number of people who visited the library during the weekdays to the number of people who visited the library during the weekends.

[2]

[1]

(c) Ashley claims that a line graph is a better representation of the data. Explain why she made such a claim.

Answer Key

1	(a) $\sqrt{5}, \frac{3\pi}{2}$ (b) 29 (c) $\sqrt{16}, 1, 9$	
2	(a) 10.09 (b) 20 900 (c) $\frac{10-\sqrt{9}}{1+4} = 1.4$ or $1\frac{2}{5}$	
3	(a) $1428 = 2 \times 2 \times 3 \times 7 \times 17$ $2660 = 2 \times 2 \times 5 \times 7 \times 19$ HCF of 1428 and 2660 $2 \times 2 \times 7 = 28$ (b) Lowest common multiple of $2^6 \times 3^2 \times 5^{15}$ and $2^5 \times 3^3 \times 7$ $2^6 \times 3^2 \times 5^{15} \times 7$ Reject: non-index notation answer (c) $2304 = 2^8 \times 3^2$ $\sqrt{2304}$ $\sqrt{2^8 \times 3^2}$ $2^4 \times 3 = 48$ (d) $168 = 2^3 \times 3 \times 7$ $168k = 2^4 \times 3^2 \times 7^2$ $k = 2 \times 3 \times 7$ $k = 42$	
4	(a) $2 + 3 - 25 \div (-5)^2$ $2 + 3 - 25 \div 25$ $5 - 1 = 4$ (b) $\frac{18}{5} - 2\left(\frac{4}{6} + \frac{5}{6}\right) \div \left(\frac{7}{6}\right)$ $\frac{18}{5} - 2 - \frac{9}{6} \div \frac{7}{6}$ $\frac{18}{5} - 2 - \frac{9}{6} \times \frac{6}{7}$ $\frac{18}{5} - 2 - \frac{9}{7}$ $\frac{126}{35} - \frac{70}{35} - \frac{45}{35} = \frac{11}{35}$	
5	(a)(i) $ac^2 - 4b^2$ $(5)(-1)^2 - 4(-3)^2$ -31 (ii) $\frac{de-5f}{def}$ $\frac{\left(-\frac{1}{3}\right)\left(\frac{5}{7}\right) - 5\left(\frac{3}{8}\right)}{\left(-\frac{1}{3}\right)\left(\frac{5}{7}\right)\left(\frac{3}{8}\right)}$ $23\frac{2}{3}$ o.e (b) (i) $-5\left(2b - \frac{7}{5}\right)$ $-10b + 7$ o.e (c)(i) $2a - 14a^2b + 22ab^2$ $2a(1 - 7ab + 11b^2)$	

	$(d) \frac{\frac{2(x+3)}{5} - \frac{3(x-2)}{4}}{\frac{8(x+3)}{20} - \frac{15(x-2)}{20}}$ $\frac{8x+24-15x+30}{20}$ $\frac{-7x+54}{20}$													
6	(a)(i) 7, 9 (ii) $-130, -258$ (b)(i) 28 (b)(ii) $4 + 6n$ (b)(iii) $4 + 6n$ $4 + 6(200)$ 1204													
7	(a) $m = \frac{66\frac{2}{3}}{100} \times 78 = 52$ (b) $n = \frac{100}{160} \times 280 = 175$ (c) Amount paid $(1 - 0.17) \times (1 + 0.1) \times (1 + 0.07) \times x$ Award M1 only if multiplication of 3 percentages is seen $\\$0.97691x / \\$0.977x$ (to 3s.f)													
8	<table border="1"> <thead> <tr> <th>Cost of 1 battery (Pack A)</th> <th>Cost of 1 battery (Pack B)</th> <th>Cost of 1 battery (Pack C)</th> </tr> </thead> <tbody> <tr> <td>15.90</td> <td>12.60</td> <td>14.90</td> </tr> <tr> <td><u>16</u></td> <td><u>10</u></td> <td><u>12</u></td> </tr> <tr> <td>\$0.99</td> <td>\$1.26</td> <td>\$1.24</td> </tr> </tbody> </table> Method of comparing cost of same quantity of batteries, number of batteries for same price A(correct answer circled based on correct working)	Cost of 1 battery (Pack A)	Cost of 1 battery (Pack B)	Cost of 1 battery (Pack C)	15.90	12.60	14.90	<u>16</u>	<u>10</u>	<u>12</u>	\$0.99	\$1.26	\$1.24	
Cost of 1 battery (Pack A)	Cost of 1 battery (Pack B)	Cost of 1 battery (Pack C)												
15.90	12.60	14.90												
<u>16</u>	<u>10</u>	<u>12</u>												
\$0.99	\$1.26	\$1.24												
9	Average speed $\frac{33 + 22}{\frac{250}{60} + \frac{1}{4} + 2}$ $8\frac{4}{7}$ km/h / $\frac{60}{7}$ / 8.57 km/h (3s.f)													
10	(a) Sum of remaining angles = $360^\circ - 4(52^\circ) = 152^\circ$ Each of the remaining angles = $152^\circ \div 4 = 38^\circ$ (b) $\frac{(n-2) \times 180^\circ}{n} = 120^\circ$ or $\frac{360^\circ}{n} = 60^\circ$ $(n - 2) \times 180^\circ = 120^\circ n$ $60n = 360$ $n = 6$													

11	$\angle a = 105$ (corresponding angles) $\angle b + 95 = 130$ (Alternate angles) $\angle b = 35$ $\angle CBE = 105$ (Vertically opposite angles) $\angle c = 180 - 105 - 35$ (Angles sum of a triangle) $= 40$ $\angle c + \angle d = 95$ (Exterior angles of a triangle) $\angle d = 95 - 40$ (Exterior angles of a triangle) $= 55$ [For Q5, deduct 1m from whole question for wrong reason or no reason stated]	
12	(a) Perimeter = $13 + 19 + 5 + 7 + 10 + \pi(6) = 72.8$ cm (b) Area of trapezium $\frac{1}{2}(19 + 7 + 12)(12) = 228$ cm ² Area of semi-circle $\frac{1}{2}\pi(6)^2 = 18\pi$ cm ² Shaded area $228 - 7 \times 4 - 18\pi$ 143 cm ² (to 3sf)	
13	(a) Volume = $20 \times 20 \times 48 - \pi\left(\frac{12}{2}\right)^2 \times 48$ $= 13771.32 = 13800$ cm ³ (b) Curved surface area of cylinder = $2\pi(6)(48)$ Outer surface area of slab $= 2(20)(20) - 2\pi(6)^2 + 4(20)(48)$ $= 4640 - 72\pi$ Total surface area = $4640 - 72\pi + 576\pi$ $= 6223.36$ cm ² $= 6220$ cm ² For question 9, Deduct 1m from the whole question if student - did not use 4 or 5 significant figures in working OR - did not express final answer of each part to 3 significant figure.	
14	(a) $p = -20$ or $q = 130$ (b) Graph Drawn (c)(i) $\$85 \pm \1 (ii) 59 cupcakes (d) Gradient = 3 A profit of \$3 is made for selling 1 cupcake. (e) 17 cupcakes	
15	 (a) (b) 1450:500 29:10 (c) The trend of data over time is better represented using line graph.	