



2025 End-Of-Year Examination Secondary Two General 3

CANDIDATE
NAME

FORM CLASS /
SUBJECT GROUP

 /

INDEX
NUMBER

MATHEMATICS

2 October 2025

2 hours 30 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use paper clips, glue or correction fluid.

Answer **all** the questions.

The number of marks is given in brackets [] at the end of each question or part question.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

You are reminded of the need for clear presentation in your answers. Up to 2 marks may be deducted for improper presentation.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142.

Q1		Q2		Q3		Q4		Q5		Q6		Q7	
4		4		5		3		3		2		4	
Q8		Q9		Q10		Q11		Q12		Q13		Q14	
3		3		3		4		3		5		6	
Q15		Q16		Q17		Q18		Q19		Q20		Q21	
5		5		4		8		8		9		9	
						Presentation Deduction	-1 / -2		Total (100)				

This document consists of 21 printed pages and 1 last page.

Mathematical Formulae*Compound interest*

$$\text{Total amount} = P \left(1 + \frac{r}{100} \right)^n$$

Mensuration

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

$$\text{Area of triangle } ABC = \frac{1}{2} ab \sin C$$

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

$$\text{Sector area} = \frac{1}{2} r^2 \theta, \text{ where } \theta \text{ is in radians}$$

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

1 Simplify

(a) $3(3x - 2) + 1$,

Answer [1]

(b) $\frac{2x}{3} + x$,

Answer [1]

(c) $3x - 2(x - 5)$.

Answer [2]

2 **(a)** Factorise $2x^2 + 7x - 15$.

Answer [2]

(b) Hence factorise completely $2(2y + 1)^2 + 7(2y + 1) - 15$.

Answer [2]

3 Simplify

(a) $\frac{12a^3b}{7} \div \frac{ac^2}{b^2}$,

Answer [2]

(b) $\frac{9a^2-1}{3a^2+16a+5}$.

Answer [3]

4 Solve $\frac{-2}{x-3} = x$.

Answer $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

5 Given $p = \frac{q - r^2 + 3}{2qr^3}$,

(a) evaluate p when $r = -2$ and $q = 3$.

Answer $p = \dots\dots\dots$ [1]

(b) express q in terms of p and r .

Answer $q = \dots\dots\dots$ [2]

- 6 There are 25 adults and 7 children in the theatre room. After another $2y$ adults and y children entered the theatre room, the probability of selecting a child at random becomes $\frac{2}{7}$. Find the value of y .

Answer $y =$ [2]

- 7 Mrs Chan has a map of Singapore drawn to a scale 1 : 120 000 .
 The distance on the map between Bird Paradise and her house is 15 cm.
 (a) Calculate the actual distance, in kilometres, between Bird Paradise and her house.

Answer km [2]

- (b) Bird Paradise covers an area of 0.17 km^2 . Calculate the area, in square centimetres, covered by the Bird Paradise on the map.

Answer cm^2 [2]

- 8 Express $\frac{2}{2x-3} - \frac{6-4x}{4x^2-12x+9}$ as a single fraction.

Answer [3]

- 9** In a physics experiment using Hooke's Law, the force F in Newtons (N) required to stretch a spring is directly proportional to its extension x , in metres.
When the spring is stretched by 5 cm, a force of 2.5 N is needed.

(a) Find the equation connecting F and x .

Answer [2]

(b) Hence, calculate the force needed to stretch the same spring by 8 cm.

Answer N [1]

- 10** Given that $\frac{3(x-1)}{2} \leq x+1$, find the greatest possible value of x if x is
(a) a perfect square,

Answer $x =$ [2]

(b) a prime number.

Answer $x = \dots\dots\dots$ [1]

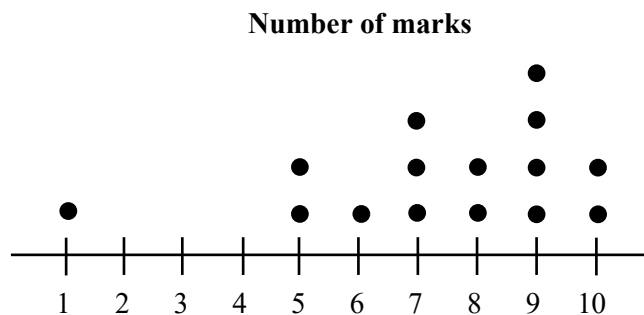
- 11** One solution of the equation $kx^2 + (k+2)x - 2 = 0$ is $x = \frac{1}{3}$.
(a) Find the value of k .

Answer $k = \dots\dots\dots$ [2]

- (b)** Hence, find the other solution of the equation.

Answer $x = \dots\dots\dots$ [2]

- 12** The dot diagram shows the distribution of marks that 15 students from Class A scored in a science quiz. The maximum score is 10 marks.



- (a)** Describe the dot diagram shown above.

.....

..... [2]

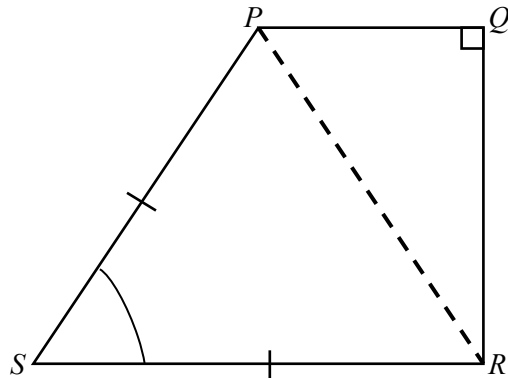
(b) State the modal mark(s).

Answer mark(s) [1]

-
- 13** A fraction is equivalent to $\frac{1}{6}$ if 1 is subtracted from the numerator and 3 is added to its denominator. If 2 is added to the numerator and 5 is subtracted from the denominator of the original fraction, the resulting value is $\frac{3}{5}$. Find the original fraction.

Answer [5]

14



The diagram shows a field $PQRS$ on horizontal ground, crossed by a pathway PR .

$RS = SP$, $PQ = 60$ m, $QR = 80$ m and angle $PSR = 73.8^\circ$.

- (a) Show that angle $SPQ = 106.2^\circ$, correct to one decimal place.

Answer

[2]

- (b) Find SR .

Answer m [2]

- (c) Find the shortest distance from Q to PR .

Answer m [2]

- 15** The stem-and-leaf diagram shows the height of 10 students.

15		2	6	9			
16		0	1	1	1	2	5
17		3					

Key: 15 | 2 means 152 cm

- (a)** Calculate the mean height of these students.

Answer cm [2]

- (b)** The height of another student is added to the stem-and-leaf diagram and the mean height of the students increases by 3 cm.

- (i)** Calculate the height of the student added.

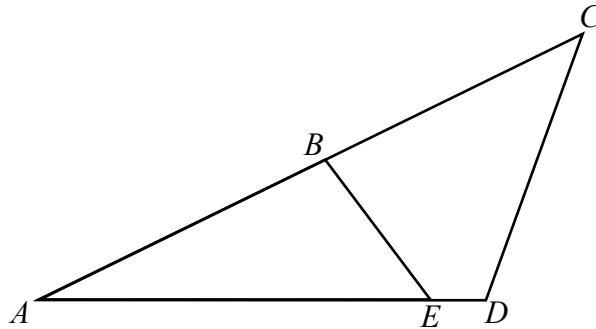
Answer cm [2]

- (ii) How will the addition of this student's height affect the median?

.....

..... [1]

16



Triangle ABE is a reduction of triangle ADC . Given that $BE = 5$ cm, $DC = 7.5$ cm, $AE = 8$ cm and the perimeter of triangle ADC is 28.5 cm, find the

- (a) scale factor of the reduction,

Answer [1]

- (b) length of AC ,

Answer cm [2]

- (c) length of AB .

Answer cm [2]

17 The timings of 30 runners who completed a 3.5 km run were recorded.

12.9	15	20.7	39	13.6	35
42.1	31	35	36.8	22	29.8
33.6	35.7	14.4	46	27.7	23.4
34	15.8	43.6	35	15.8	40
37.2	20.5	27	43.1	48.8	27

(a) Complete the frequency table below.

Time (x minutes)	Frequency
$10 < x \leq 20$	
$20 < x \leq 30$	8
$30 < x \leq 40$	
$40 < x \leq 50$	5

[2]

(b) A runner was chosen at random.
Find the probability that the runner's timing was

(i) not between 20 to 30 minutes inclusive,

Answer [1]

- (ii) more than 30 minutes.

Answer [1]

- 18** A gift box is in the shape of a right pyramid with square base of side 4 cm less than the vertical height.

- (a) Given that the height of the gift box is x cm, write down an expression, in terms of x , for the side of the gift box.

Answer cm [1]

- (b) The base area of the gift box is 36 cm^2 .
Write down an equation to represent this information and show that it simplifies to

$$x^2 - 8x - 20 = 0$$

[2]

- (c) Solve the equation $x^2 - 8x - 20 = 0$.

Answer $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

- (d) Explain why one of the solutions in (c) must be rejected.

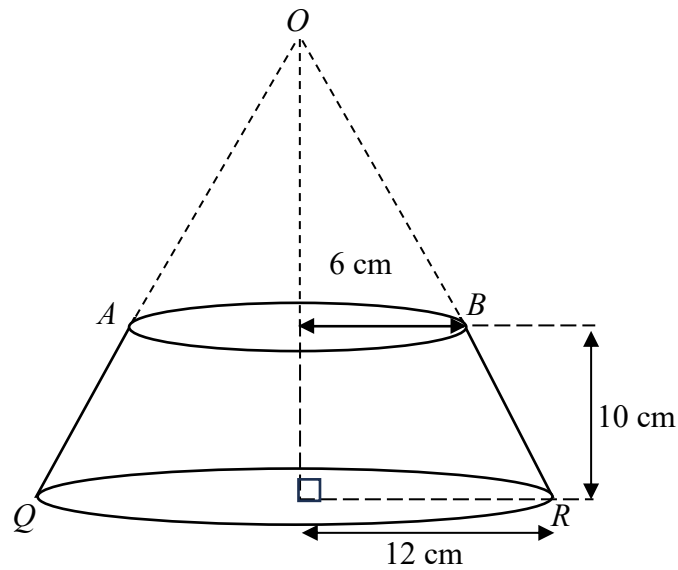
.....

..... [1]

- (e) Calculate the volume of the gift box.

Answer cm^3 [2]

- 19** The figure below shows a conical frustum $ABRQ$ which is obtained by removing the smaller cone OAB from the larger cone OQR . The base radius of cone OAB is 6 cm and the base radius of cone OQR is 12 cm. The height of the frustum is 10 cm.



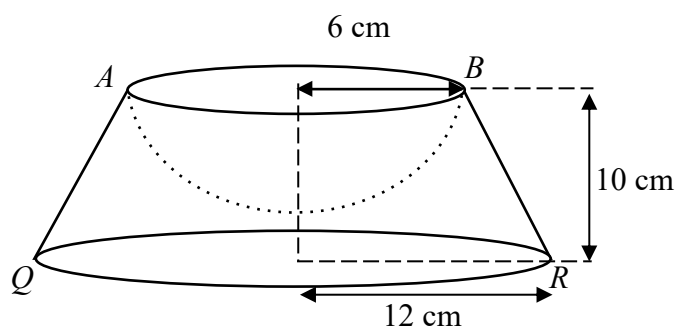
- (a)** Using similar triangles, show that the height of the cone OAB is 10 cm. [1]

Answer

- (b)** Calculate the total surface area of the conical frustum.

Answer cm^2 [4]

- (c) A solid flowerpot made of clay is modelled by the frustum $ABRQ$ with a hemisphere carved out. Find the amount of clay required to make one flowerpot.



Answer cm^3 [3]

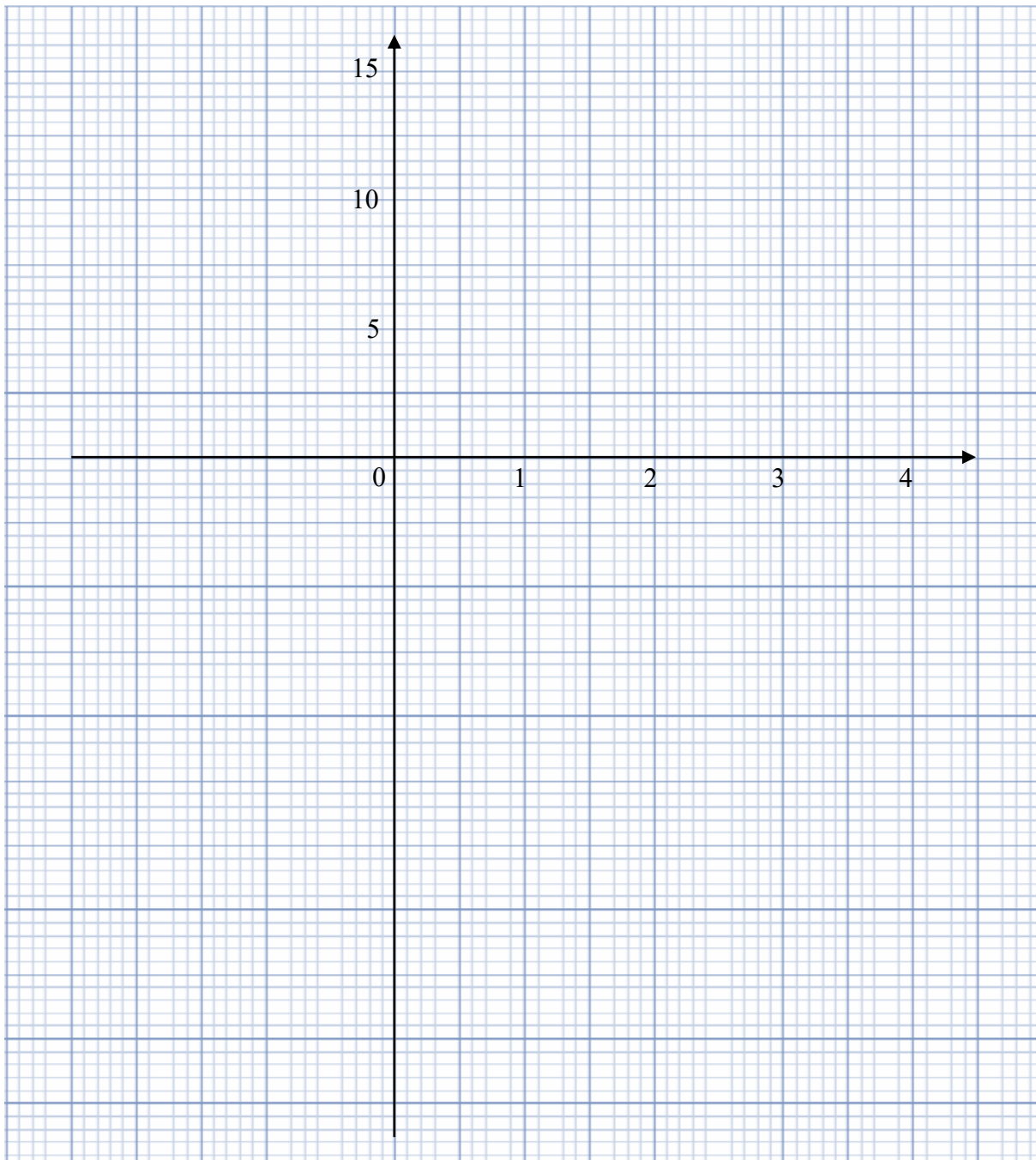
- 20 The variables x and y are connected by the equation $y = 4x^2 - 8x - 21$.

x	-2	-1	0	1	2	3	4
y	11	p	-21	-25	-21	-9	11

- (a) Find the value of p .

Answer $p = \dots\dots\dots$ [1]

- (b) On the grid, draw the graph of $y = 4x^2 - 8x - 21$ for $-2 \leq x \leq 4$.



- (c) On the same grid, draw the line $4x + y = -13$ for $-2 \leq x \leq 3$. [2]

- (d) Using your graph,

- (i) write down the coordinates of the points of intersection of the line and the curve.

Answer (..... ,)

(..... ,) [2]

- (ii) A triangle is formed by the points of intersection points in (d)(i) and $(3, -9)$.
Calculate the area of this triangle.

Answer units^2 [1]

- 21** Jason works part-time at a bubble tea shop and collected data about the number of drinks sold during different hours on a Saturday. He wants to analyse the data to help his manager optimise staff deployment.

Here are the number of drinks sold each hour from 11 am to 9 pm:

15, 18, 25, 42, 38, 42, 36, 42, 28, 25

- (a) (i)** Calculate the median number of drinks sold per hour.

Answer drinks [2]

- (ii)** The manager defines peak hours as times when the number of drinks sold are greater the median. Calculate the mean number of drinks sold during peak hours.

Answer drinks [2]

- (b) During peak hours, each drink generates a profit of \$3 to the bubble tea shop. Jason estimates that an additional staff member can increase the number of drinks sold by 25% during peak hours. Every staff member earns \$15 per hour.

Would you recommend Jason proposing to the manager to hire an additional staff member during peak hours? Justify your answer using appropriate calculations.

.....

.....

.....

[5]

232319

BLANK PAGE