



**REGENT SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2023
SECONDARY TWO EXPRESS**

NAME: _____

INDEX NUMBER: _____

CLASS: _____

MATHEMATICS

4052/01

Paper 1

29 September 2023

1 hours 15 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on all 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 staples, paper clips, highlighters, glue or correction fluid.

Answer **all** 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.

The total of the marks for this paper is 50.

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 your answers in degrees to one decimal place.

For π , use either your calculator value or 3.142.

50	TARGET
PARENT'S SIGNATURE	

Answer **all** questions.

1 Expand and simplify the following.

(a) $(2x+1)^2$

Answer [1]

(b) $-x+2(x-3y)$

Answer [2]

2 Solve $\frac{x}{4} + \frac{2-x}{3} = 1$.

Answer $x =$ [3]

- 3 (a) Solve the inequality $x - 4 < \frac{3x - 3}{4}$.

Answer [2]

- (b) Represent your solution on the number line.



- (c) Hence, write down the largest prime number that satisfies the inequality.

Answer [1]

- 4 Factorise completely

(a) $21a^2b - 7a$,

Answer [1]

(b) $50 - 8p^2$,

Answer [2]

(c) $5ax + 2bx - 10ay - 4by$.

Answer [2]

- 5 The table below summarises the amount of time spent on a computer by a group of young children in one particular week.

Time (h hours)	$0 < h \leq 2$	$2 < h \leq 4$	$4 < h \leq 6$	$6 < h \leq 8$	$8 < h \leq 10$
Frequency	4	9	16	13	8

Calculate an estimate of the mean time spent on a computer that week.

Answer h [2]

- 6 The map of a village is drawn to a scale 1 : 350 000.

(a) The length of the road on the map is 7.5 cm.

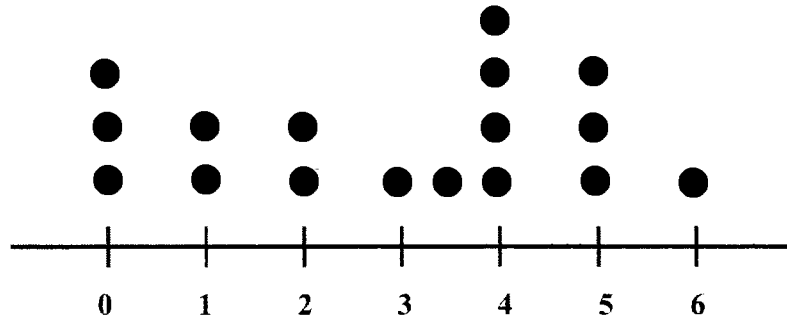
Find the actual length, in kilometres, of the road.

Answer km [2]

(b) The area of a lake is 5 km².

Calculate the area, in cm², of the lake on the map.

Answer cm² [2]



Tuition
With
Jason

Nurul wants to find out the number of hours her friends spend on homework daily. She carried out a simple survey and the dot diagram above shows the result she obtained.

(a) How many students participated in the survey?

Answer [1]

(b) How many students spend less than 2 hours on homework daily?

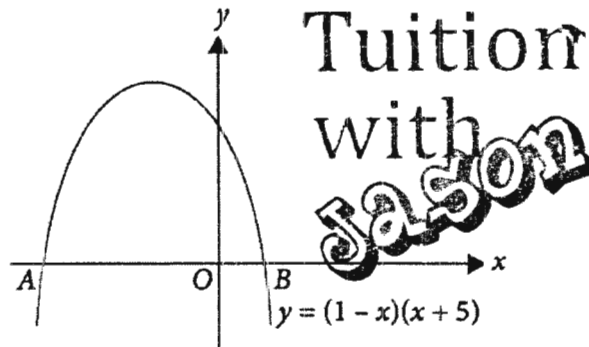
Answer [1]

(c) Nurul spends 3 hour on homework daily and she concluded that this duration is above the average number of hours her friends spent.
Do you agree with Nurul?
Explain your answer.

Answer

..... [2]

- 8 The sketch shows a quadratic curve with the equation $y = (1 - x)(x + 5)$.



- (a) Find the coordinates of A and B .

Answer $A = (\dots\dots\dots, \dots\dots\dots)$ [1]

Answer $B = (\dots\dots\dots, \dots\dots\dots)$ [1]

- (b) State the equation of the line of symmetry.

Answer $\dots\dots\dots$ [1]

- 9 A sphere has a radius r cm and total surface area of 2430 cm^2 .
Calculate r .

Answer $r = \dots\dots\dots$ [3]

10 Solve these simultaneous equations.

$$4x + 5y = 7$$

$$3x + 4y = 5$$

Answer $x =$

$y =$ [3]

11 y is connected to x by the equation $y = \frac{5}{2x}$.

(a) Find the value y when $x = 5$.

Answer $y =$ [1]

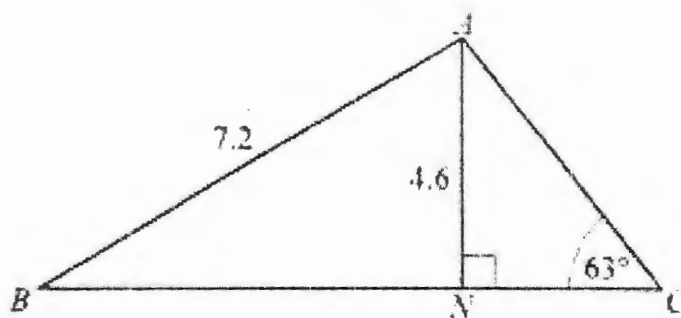
(b) “ y is directly proportional to x .”

Do you agree with the above statement? Explain your answer.

Answer

..... [1]

12



ABC is a triangle and AN is perpendicular to BC .
 $AB = 7.2$ cm, $AN = 4.6$ cm and angle $ACN = 63^\circ$.
 Calculate

(a) BN ,

Answer $BN = \dots\dots\dots$ cm [2]

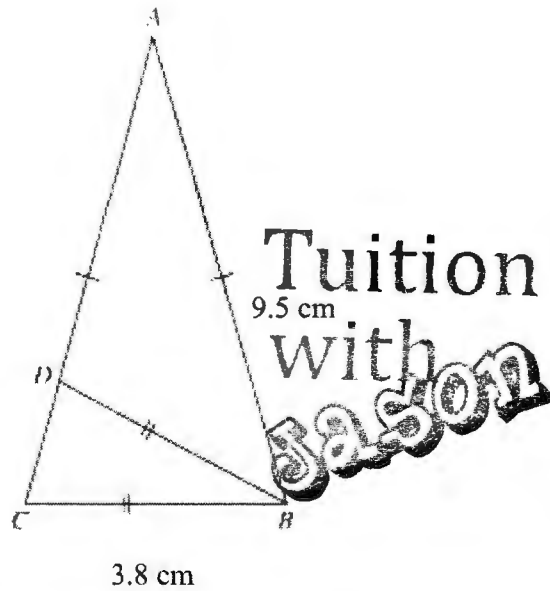
(b) NC ,

Answer $NC = \dots\dots\dots$ cm [2]

(c) the area of triangle ABC .

Answer $\dots\dots\dots$ cm^2 [2]

13



Triangle ABC is an enlargement of triangle BDC .

ABC is an isosceles triangle with $AB = AC$, and D is a point on AC such that $BC = BD$.
 $AB = 9.5$ cm and $BC = 3.8$ cm.

- (a) Given that $\angle CAB = 36^\circ$, find $\angle ABC$.

Answer $^\circ$ [2]

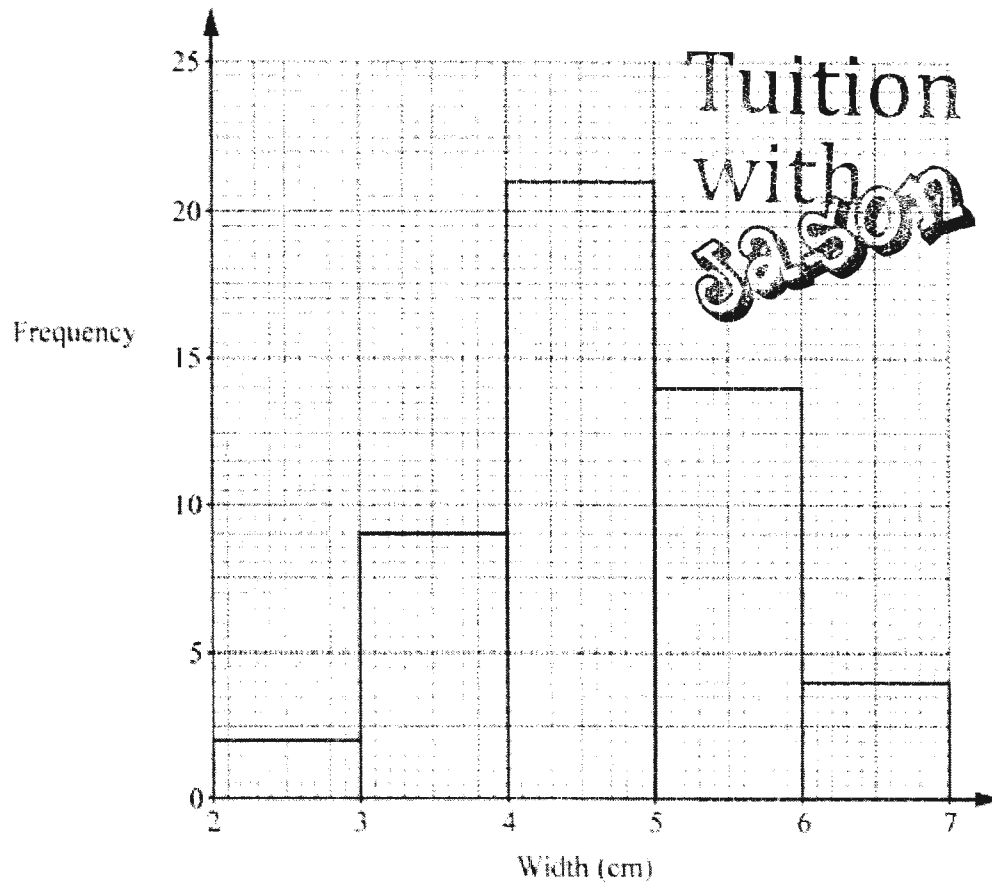
- (b) State the scale factor of the enlargement.

Answer [1]

- (c) Calculate DC .

Answer cm [2]

- 14 The histogram summarises the widths of 50 leaves collected from a garden.



- (a) How many leaves had a width of at least 5 cm?

Answer [1]

- (b) Find the probability that a leaf chosen at random has a width of between 3 cm and 5 cm.

Answer [2]

End of paper



**REGENT SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2023
SECONDARY TWO EXPRESS**

NAME: _____

INDEX NUMBER: _____

CLASS: _____

MATHEMATICS

4052/02

Paper 2

11 October 2023

Candidates answer on the Question Paper.

1 hour 30 mins

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on all 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 staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

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

Omission of essential working will result in loss of marks.

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 your answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

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

The total of the marks for this paper is 50.

50	TARGET
PARENT'S SIGNATURE	

- 1** Expand and simplify $2(3x^2 - x + 5) - 3(3x - 2)$.

Answer [2]

- 2 (a)** Simplify $\frac{9x^2}{2y^2} \div \frac{3x^3y}{8}$.

Answer [2]

- (b) (i)** Factorise $w^2 - w - 6$.

Answer [1]

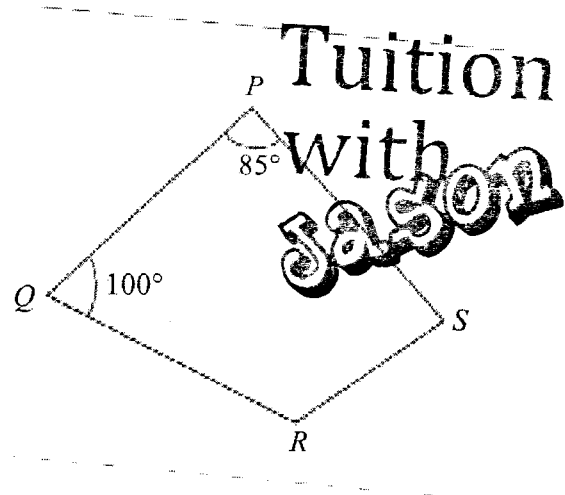
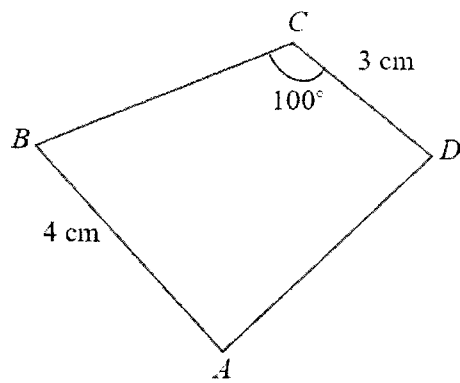
- (ii)** Hence write as a single fraction in its simplest form $\frac{5}{w^2 - w - 6} + \frac{1}{2w - 6}$.

Answer [2]

- 3 It is given that $2E = mv^2$
Express v in terms of E and m .

Answer [2]

- 4 In the diagram, quadrilateral $ABCD$ is congruent to quadrilateral $PQRS$.
It is given that $AB = 4$ cm and $CD = 3$ cm.
Angle $SPQ = 85^\circ$, angle $PQR = 70^\circ$ and angle $BCD = 100^\circ$.



- (a) State the length of PQ .

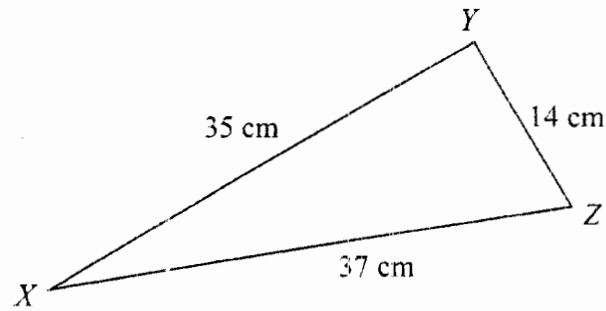
Answer cm [1]

- (b) Find the angle RSP .

Answer° [1]

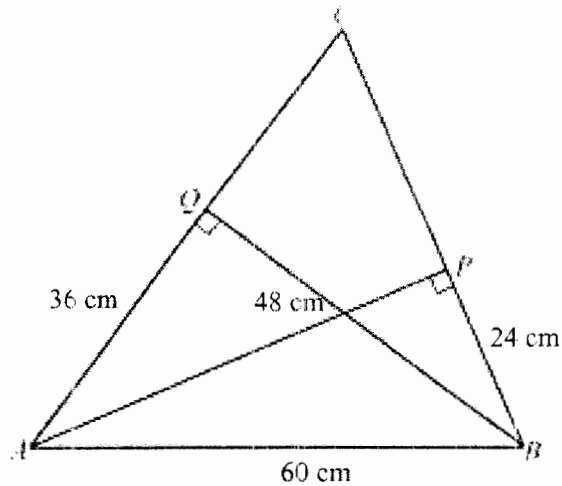
- 5 Determine if triangle YZX is a right-angled triangle.

[2]



Answer

6



In the diagram, AP is perpendicular to BC and BQ is perpendicular to AC .
 $QA = 36$ cm, $PB = 24$ cm, $QB = 48$ cm and $AB = 60$ cm.

- (a) Giving your answer as a fraction in its simplest form, find

(i) $\sin \angle QAB$,

Answer [1]

(ii) $\cos \angle PBA$.

Answer [1]

- 6 (b) (i) Show that $\angle PCQ = 60.4^\circ$, correct to 1 decimal place.

[3]

Answer

- (ii) Hence, find the length of AC .

Answer cm [2]

- 7 A class of 25 students took an English test.
The marks are shown in the stem-and-leaf diagram.

Boys				Girls			
	3	1	4	x			
7	5	3	2	5	3	9	
	8	0	0	6	4	7	
	6	4	1	7	0	3	5
		8	1	8	9	9	7

Key (Boys)

8 | 3 means 38

Key (Girls)

3 | 7 means 37

- (a) Write down the modal mark of the boys.

Answer [1]

- (b) Write down the median mark of the girls.

Answer [1]

- (c) The range of the marks for the girls is 44.
Find x .

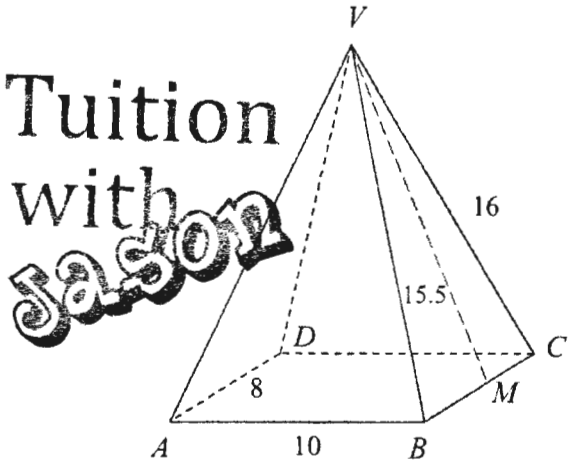
Answer [1]

- (d) The passing mark for the test was 55.
Jane claims that 75% of the students passed the English test. Do you agree?

Answer

..... [2]

- 8 The diagram shows a right rectangular pyramid $VABCD$. M is the midpoint of BC . $AB = 10$ cm, $AD = 8$ cm, $VM = 15.5$ cm and $VC = 16$ cm.



- (a) Show that the height of pyramid $VABCD$ is 14.671 cm, correct to 5 significant figures.

[2]

Answer

- (b) Calculate the volume of pyramid $VABCD$.

Answer cm³ [2]

9 A bag contains 8 red sweets, 12 green sweets and 4 blue sweets.

(a) Find, in simplest form, the probability that

(i) a green sweet is chosen,

Answer [1]

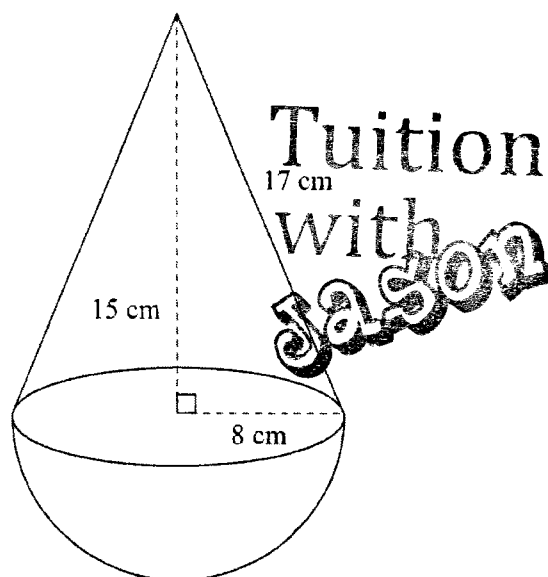
(ii) the sweet chosen is not red.

Answer [1]

(b) How many more blue sweets must be placed in the bag so that the probability of choosing blue sweets would be $\frac{1}{3}$?

Answer [1]

- 10** An iron ornament is in the shape of a cone standing on a hemisphere.
 They share the same base radius of 8 cm.
 The height of the cone is 15 cm and the slant height is 17 cm.

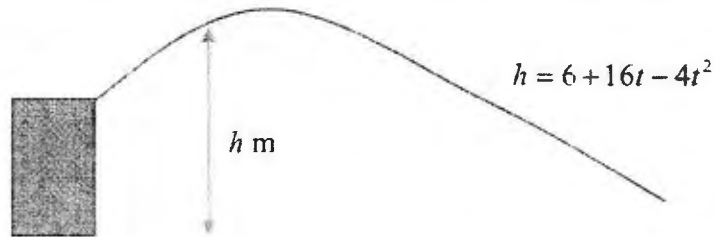


Find the total surface area of the ornament.

Answer cm^2 [3]

- 11** A ball is being thrown from a tower.
 Its height, h metres, above the ground during its journey is modelled after the equation,
 $h = 6 + 16t - 4t^2$, where t is the time in seconds after the ball is thrown.

The table below shows some corresponding h and t values for the motion of the ball.



t	0	1	1.5	2	2.5	3	4
h	6	18	21	22	21	p	6

- (a) State the height of the vertical tower.

Answer m [1]

- (b) Calculate the value of p .

Answer $p =$ [1]

- (c) On the grid provided on next page, plot the points given in the table and join them with a smooth curve. [2]

- (d) Use your graph to find

- (i) the height of the ball above ground 3.5 seconds after the ball is thrown.

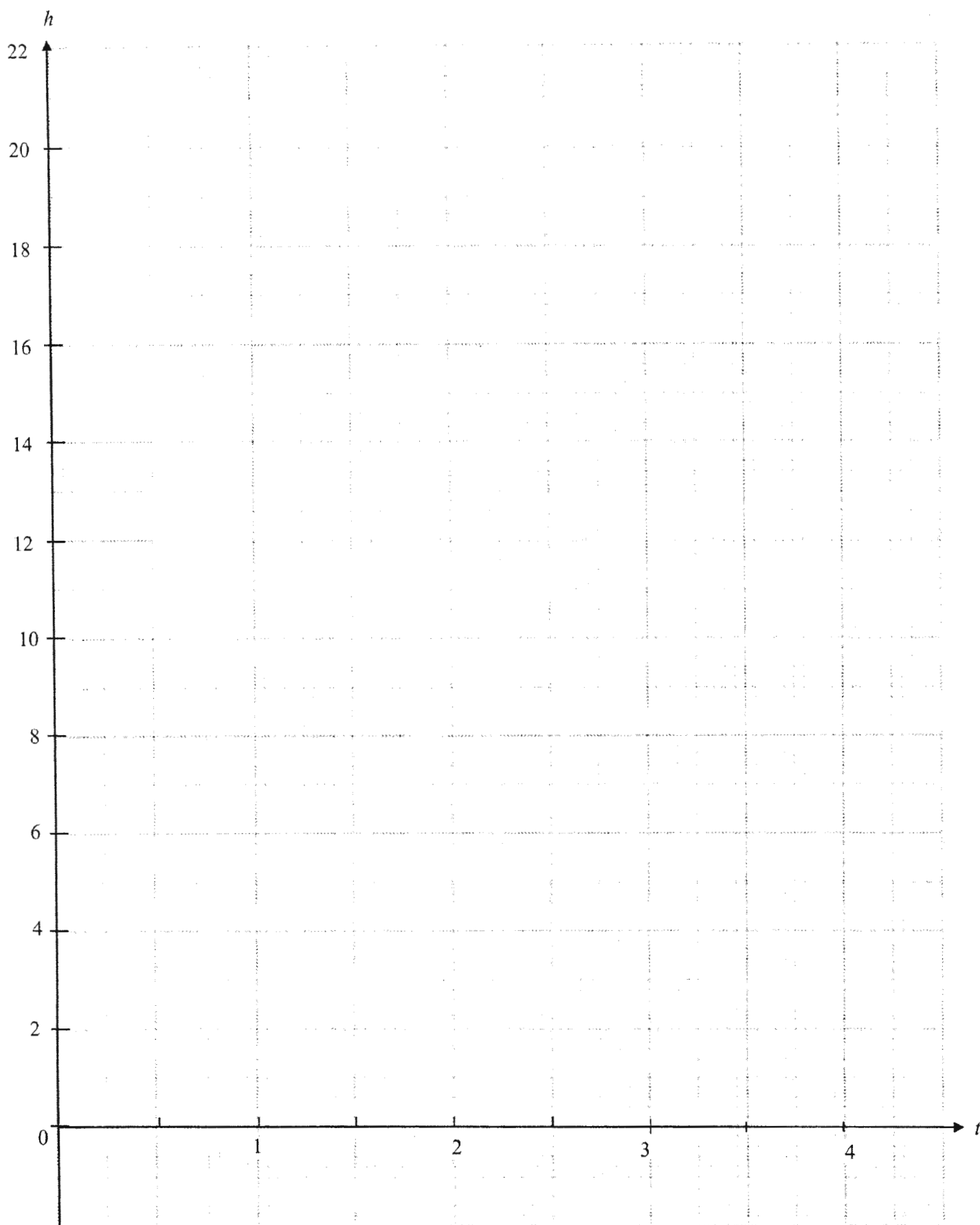
Answer m [1]

- (ii) the time taken for the ball to hit the ground.

Answer s [1]

- (e) A telephone wire is at a horizontal height of 25m above ground.
 Explain why the ball would not hit the telephone wire.

Answer [1]



12 Victor cycles at a speed of x km/h up a 30 km slope.

- (a) Write down, in terms of x , the number of hours he took to cycle up the slope.

Answer h [1]

He then cycles at a speed of $(x + 5)$ km/h down the same slope.

- (b) Write down, in terms of x , the number of hours he took to cycle down the slope.

Answer h [1]

- (c) The difference in time taken is 18 minutes.

Write down an equation in x to represent this information and show that it reduces to

$$x^2 + 5x - 500 = 0.$$

Answer

[2]

- (d) Solve the equation $x^2 + 5x - 500 = 0$.

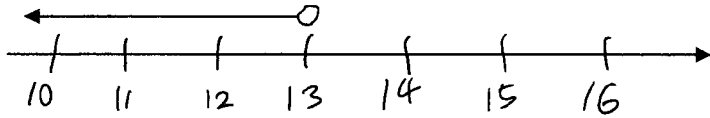
Answer $x = \dots\dots\dots$ or $\dots\dots\dots$ [2]

- (e) Hence, calculate the total time taken, in hours and minutes, Victor took for the whole journey.

Answer $\dots\dots\dots$ h [2]

End of paper

Marking scheme 2Exp EMath 2023 (SA2 Paper 1) – Setter: Ms Lee YY

Question			Remarks
1a	$4x^2 + 4x + 1$	B1	
1b	$-x + 2x - 6y$ $= x - 6y$	M1 A1	
2	$\frac{3x + 4(2 - x)}{12} = 1$ $3x + 8 - 4x = 12$ $-x = 4$ $x = -4$	M1 M1 A1	
3a	$4(x - 4) < 3x - 3$ $4x - 16 < 3x - 3$ $x < 13$	M1 A1	
3b		B1	Allow ecf
3c	11	B1	Allow ecf
4a	$7a(3ab - 1)$	B1	
4b	$2(25 - 4p^2)$ $= 2(5 - 2p)(5 + 2p)$	M1 A1	
4c	$x(5a + 2b) - 2y(5a + 2b)$ $= (5a + 2b)(x - 2y)$	M1 A1	
5a	$\frac{274}{50}$ $= 5.48h$	M1 A1	
6a	7.5×3.5 $= 26.25km$	M1 A1	
6b	$1cm^2 : 12.25km^2$ $\frac{5}{12.25}$ $= 0.408cm^2$	M1 A1	
7a	17 students	B1	
7b	5 students	B1	

7c	Yes, I agree with Nurul. This is because the mean duration is 2.91 hours and 3 hours is more than 2.91 hours.	M1 A1	
8a	$A = (-5, 0)$ $B = (1, 0)$	B1 B1	
8b	$x = -2$	B1	
9	$2430 = 4\pi r^2$ $r^2 = \frac{2430}{4\pi}$ $r = \sqrt{\frac{2430}{4\pi}}$ $r = 13.90587...$ $r = 13.9$	M1 M1 A1	
10	$12x + 15y = 21$ $12x + 16y = 20$ $y = -1$ $x = 3$	M1 A1 A1	Accept any other reasonable method
11a	$y = \frac{1}{2}$	B1	
11b	No, as y decreases when x increases, y is not directly proportional to x. OR No, as y decreases when x increases, y is inversely directly proportional to x.	B1	Award B1 only if students provide justifications
12a	$BN^2 + 4.6^2 = 7.2^2$ $BN = 5.5390...$ $BN = 5.54cm$	M1 A1	
12b	$\tan 63^\circ = \frac{4.6}{NC}$ $NC = \frac{4.6}{\tan 63^\circ}$ $NC = 2.34382...$ $NC = 2.34cm$	M1 A1	

12c	$\frac{1}{2} \times 7.8828... \times 4.6$ $= 18.13048...$ $= 18.1 \text{ cm}^2$	M1 A1	
13a	$\frac{180^\circ - 36^\circ}{2}$ $= 72^\circ$	M1 A1	
13b	2.5	B1	
13c	$\frac{3.8}{2.5}$ $= 1.52 \text{ cm}$	M1 A1	
14a	18 leaves	B1	
14b	$\frac{30}{50}$ $= \frac{3}{5}$	M1 A1	

1/2

Qns	Solutions (2Exp P2)	Marks
1	$2(3x^2 - x + 5) - 3(3x - 2) = 6x^2 - 2x + 10 - 9x + 6$ $= 6x^2 - 11x + 16$	M1 A1
2a	$\frac{9x^2}{2y^2} \div \frac{3x^3y}{8} = \frac{9x^2}{2y^2} \times \frac{8}{3x^3y}$ $= \frac{72x^2}{6x^3y^3}$ $= \frac{12}{xy^3}$	M1 for flipping fraction A1
2bi	$w^2 - w - 6 = (w - 3)(w + 2)$	B1
2bii	$\frac{5}{w^2 - w - 6} + \frac{1}{2w - 6} = \frac{5}{(w - 3)(w + 2)} + \frac{1}{2(w - 3)}$ $= \frac{5(2) + (w + 2)}{2(w - 3)(w + 2)}$ $= \frac{10 + w + 2}{2(w - 3)(w + 2)}$ $= \frac{12 + w}{2(w - 3)(w + 2)}$	M1 for common denominator A1
3	$2E = mv^2$ $v^2 = \frac{2E}{m}$ $v = \pm \sqrt{\frac{2E}{m}}$	M1 for finding v^2 A1 (must include $\pm$)
4a	4	B1
4b	105	B1
5	$XZ^2 = 37^2$ $= 1369$ $XY^2 + XZ^2$ $= 35^2 + 14^2$ $= 1421$ Since $XY^2 + YZ^2 \neq XZ^2$, then by the converse of Pythagoras' Theorem, triangle XYZ is not a right-angled triangle.	M1 A1

Qns	Solutions (2Exp P2)	Marks
6ai	$\sin \angle QAB = \frac{48}{60}$ $= \frac{4}{5}$	B1
6aii	$\cos \angle PBA = \frac{24}{60}$ $= \frac{2}{5}$	B1
6bi	$\angle CAB = \sin^{-1}\left(\frac{4}{5}\right) = 53.1301\dots$ $\angle CBA = \cos^{-1}\left(\frac{2}{5}\right) = 66.4218\dots$ $\angle PCQ = 180 - \text{their } 53.1301 - \text{their } 66.4218$ $= 60.44807612$ $= 60.4 \text{ (shown)}$	M1 for each angle found A1
6bii	$\tan \angle QCB = \frac{48}{QC}$ $QC = \frac{48}{\tan 60.44807612}$ $= 27.2145\dots$ $AC = 27.2145 + 36$ $= 63.2$	M1 for QC (no ECF) A1
7a	60	B1
7b	70	B1
7c	5	B1
7d	$= \frac{19}{25} \times 100\%$ Percentage pass = 76% I disagree as there are 76% passes.	M1 A1 for conclusion
8a	$\text{height} = \sqrt{15.5^2 - 5^2}$ $= \sqrt{215.25}$ $= 14.67140075$ $= 14.671 \text{ (shown)}$	M1 A1 (must see 14.6714 first)
8b	$\text{vol} = \frac{1}{3} \times (8)(10) \times 14.67140075$ $= 391 \text{ cm}^3$	M1 A1

Qns	Solutions (2Exp P2)	Marks
9ai	$\frac{1}{2}$	B1
9aia	$\frac{2}{3}$	B1
9b	$\frac{x+4}{x+24} = \frac{1}{3}$ $3x+12 = x+24$ $2x = 12$ $x = 6$	B1
10	$SA = \pi r l + 2\pi r^2$ $= \pi(8)(17) + 2\pi(8)^2$ $= 136\pi + 128\pi$ $= 829.380$ $= 829\text{cm}^2 \quad (3sf)$	M1 for $\pi(8)(17)$ M1 for $2\pi(8)^2$ A1
11a	6	B1
11b	18	B1
11c	Smooth curve through 7 correct points. Refer to attached.	B2FT for 7 points plotted correctly and smoothly B1FT for 6 or 7 points plotted correctly
11di	13 (± 0.1)	B1
11dii	4.35 (± 0.05)	B1
11e	The maximum height of the ball is <u>22m</u> above ground. Hence, the ball would not hit the wire.	B1
12a	$\frac{30}{x}$	B1
12b	$\frac{30}{x+5}$	B1
12c	$\frac{30}{x} - \frac{30}{x+5} = \frac{18}{60}$ $\frac{30(x+5) - 30(x)}{x(x+5)} = \frac{18}{60}$ $\frac{30x+150-30x}{x(x+5)} = \frac{3}{10}$ $10(150) = 3(x^2 + 5x)$ $3x^2 + 15x - 1500 = 0$ $x^2 + 5x - 500 = 0(\text{shown})$	M1 for correct equation A1

Qns	Solutions (2Exp P2)	Marks
12d	$x^2 + 5x - 500 = 0$ $(x - 20)(x + 25) = 0$ $x = 20 \text{ or } x = -25$	M1 for factorisation A1 for both answers
12e	$\frac{30}{20} + \frac{30}{25} = 2h \ 42 \text{ min } s$	M1 for either time A1

