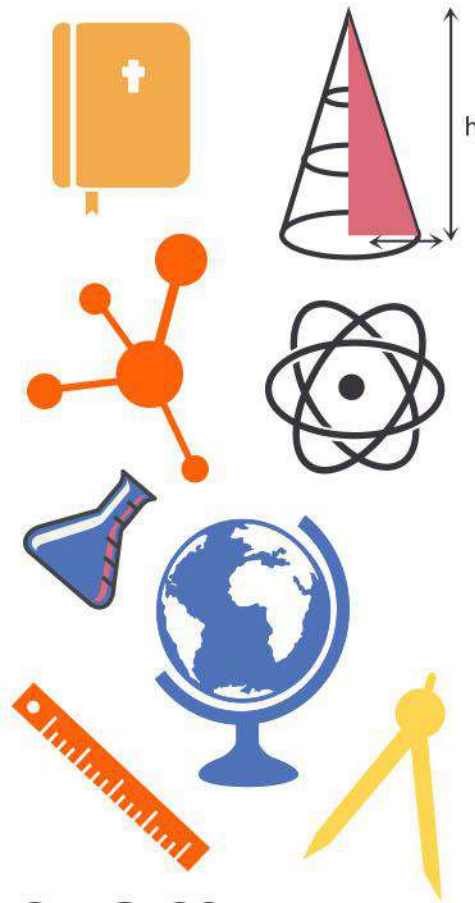


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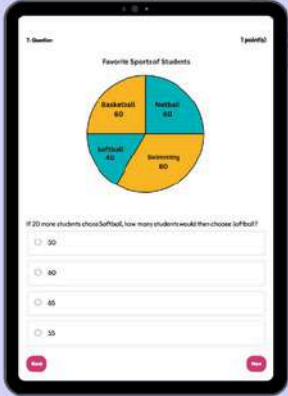


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MATHEMATICS

PAPER 1 (CORE/EXTENDED) 3815/1

Tuesday **20 MAY 2025** 1:00 P.M.–2:30 P.M.

Additional materials:
Calculator (not graphing)
Geometrical instruments

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your School Number, Candidate Number, Surname and Initials in the spaces provided at the top of this page.

Answer **ALL** questions in the spaces provided for each question.

ALL working must be shown.

ALL working must be done in blue or black ink, except for drawings, lines and constructions which may be done in pencil.

INFORMATION FOR CANDIDATES

Calculators [**NOT GRAPHING CALCULATORS**] may be used.

Tracing paper may be used.

Geometrical instruments are required.

The mark for each question, or part question, is shown in brackets [].

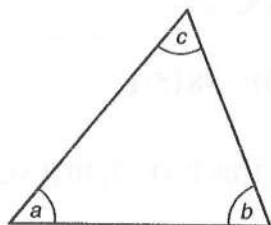
The total number of marks for this paper is 100.



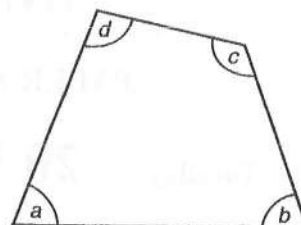
This question paper consists of 15 printed pages and 1 blank page.

INFORMATION AND FORMULAE

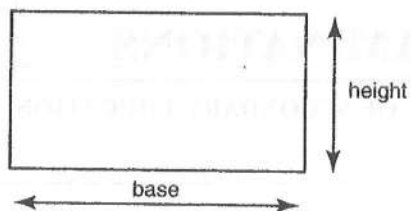
MENSURATION



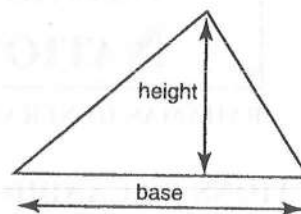
Angle sum of triangle
 $a + b + c = 180^\circ$



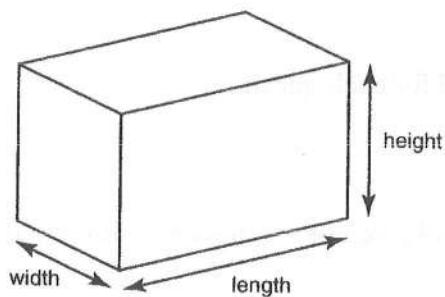
Angle sum of quadrilateral
 $a + b + c + d = 360^\circ$



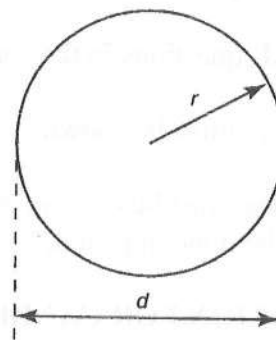
Area of rectangle = base $\times$ height



Area of triangle = $\frac{\text{base} \times \text{height}}{2}$



Volume of cuboid = length $\times$ width $\times$ height



Circumference of circle = $2\pi r$ or πd
 Area of circle = πr^2

NUMBER

Standard form is $a \times 10^n$ where $1 \leq a < 10$ and n is an integer.



1. A number pattern is shown below.

$$\begin{array}{rcl} 1 & & = 1 \\ 1 + 2 & & = 3 \\ 1 + 2 + 3 & & = 6 \\ 1 + 2 + 3 + 4 & & = 9 \\ \boxed{} & & \\ 1 + 2 + 3 + 4 + 5 + 6 & & = 21 \end{array}$$

- (a) Write the missing row from the number pattern in the box above. [1]
- (b) Find the sum of the 10th row.

Answer: _____ [1]

2. Write the following ratios in their simplest form:

(a) $144 : 360$

Answer: _____ [1]

(b) $\frac{7}{8} : \frac{11}{4}$

Answer: _____ [1]

(c) $68 \text{ g} : 1.9 \text{ kg}$

Answer: _____ [1]

[Turn over]

3. (a) Find the exact value of $\frac{575.6492 - 126.38}{2.4}$

Answer: _____ [1]

- (b) Give your answer in part (a) correct to

(i) 2 significant figures, Answer: _____ [1]

(ii) the nearest hundredth. Answer: _____ [1]

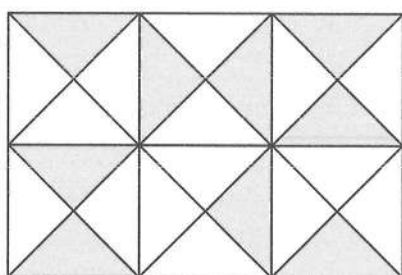
4. Insert one of the symbols in the space provided to make the given statement true:

<, >, =

(a) $\frac{8}{17}$ 0.47 [1]

(b) $\sqrt{250}$ 2^4 [1]

5. The diagram shows a triangular tile arrangement.



- (a) State in lowest terms the fraction of the tiles that are shaded.

Answer: _____ [1]

- (b) Give your answer to part (a) as a decimal.

Answer: _____ [1]



6.



Rolls of plait are used to make straw bags.

It takes $\frac{1}{3}$ of a roll to make a straw purse.

It takes $\frac{4}{5}$ of a roll to make a tote bag.

If seven rolls of plait are available, find the fraction that is left after making 5 purses and 6 tote bags.

Answer: _____ [4]

7. Evaluate, giving your answer as a fraction:

$$42\frac{3}{8} - \left(1\frac{2}{7} + 4\frac{2}{3}\right) \div \frac{1}{7}$$

Answer: _____ [3]

[Turn over

8. Lemonade is made using 2 parts lemon juice, 3 parts syrup and 10 parts water.

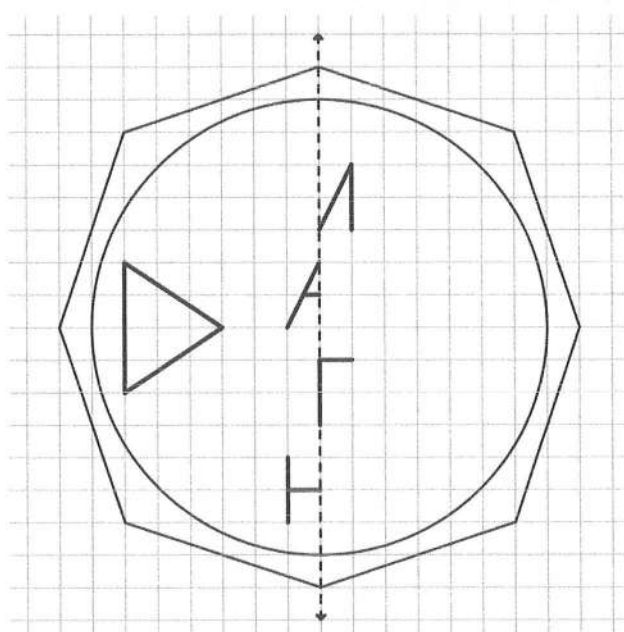
(a) If 4,500 *ml* of lemonade is made, determine the amount of syrup needed.

Answer: _____ *ml* [2]

(b) Find the amount of lemonade that can be made with 200 *ml* of lemon juice.

Answer: _____ *ml* [2]

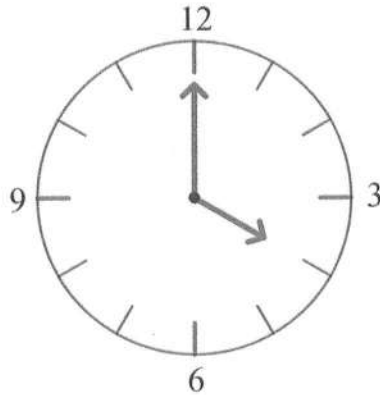
9.



Complete the diagram so that it is symmetric about the dashed line.

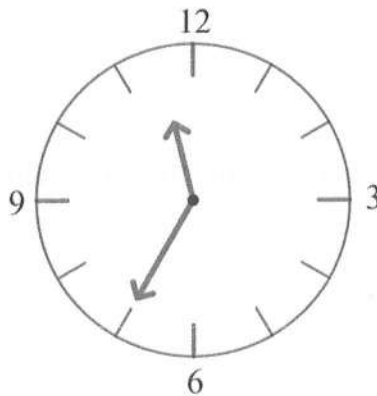
[4]

10. (a) Determine the obtuse angle between the hour and minute hands in the clock below.



Answer: _____ ° [2]

- (b) (i) State the clock time below.



Answer: _____ [1]

- (ii) If the time in (b)(i) is in the morning, state the time it would be in 8 hours and 45 minutes.

Answer: _____ p.m. [2]

- (c) State 2:50 p.m. in the 24-hour clock.

Answer: _____ [1]

11.



There are 150 junkanoo enthusiasts at an event.

15 play the cowbells.

42 play the horns.

28 are dancers.

The remainder play the drums.

If one enthusiast is selected at random, find the probability that the person

(a) plays the drums,

Answer: _____ [2]

(b) is not a dancer,

Answer: _____ [1]

(c) plays cowbells or horns,

Answer: _____ [1]

(d) plays the piano.

Answer: _____ [1]



12. (a) Write 108 as a product of prime factors.

Answer: _____ [2]

- (b) Find the smallest number by which 108 must be multiplied to make the product a perfect square.

Answer: _____ [1]

-
13. Mark takes $\frac{3}{4}$ hour to drive to his place of work 36 km away.

- (a) What was his average speed in km/h?

Answer: _____ km/h [2]

Over the weekend, Mark took a road trip on which he travelled at an average speed of 52 km/h for $2\frac{1}{2}$ hours.

- (b) Calculate the total distance travelled during the trip.

Answer: _____ km [2]

[Turn over



14. The following information shows the cost **per person** for one night's stay at the hotels listed.

HOTEL	MIDWEEK (\$)	WEEKEND (\$)
MOONLIGHT HOTEL	128.00	138.00
FARRIOT	134.00	144.00
PINEAPPLE LODGE	161.00	171.00
MILTON	156.00	166.50

***All prices include taxes.**

- (a) (i) State which hotel has the lowest midweek rate.

Answer: _____ [1]

- (ii) Find the difference between the cheapest and most expensive midweek rate.

Answer: \$ _____ [1]

- (b) Calculate the total cost for 2 persons staying at the Milton on a Wednesday night.

Answer: \$ _____ [2]

- (c) On a Saturday night, 4 persons stayed at the Farriot.

Rental for a van totaled \$85.

The cost of food and entertainment cost \$130 per person.

Calculate the total cost for all 4 persons.

Answer: \$ _____ [3]

A person stayed at the Moonlight Hotel on Saturday night and paid a total of \$27.60 in taxes.

- (d) (i) Find the cost of the room before taxes.

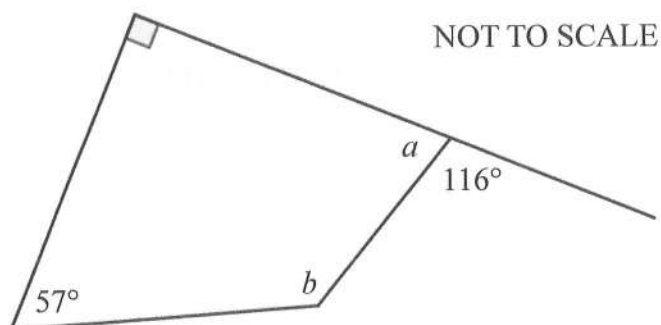
Answer: \$ _____ [1]

- (ii) State the tax amount as a percentage of the cost of the room before tax was included.

Answer: _____ % [2]

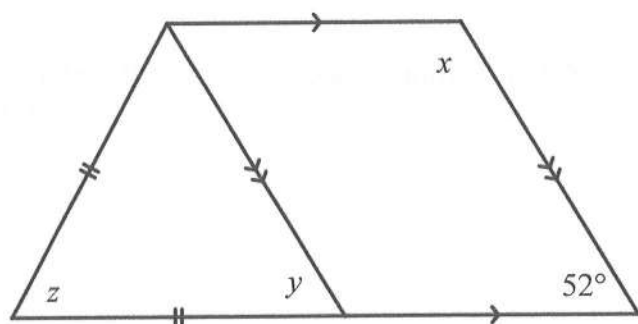


15. Find the sizes of the lettered angles in the diagrams below.



a : _____° [1]

b : _____° [1]



x : _____° [1]

y : _____° [1]

z : _____° [1]

16. At a souvenir shop, the price of a keychain is \$ x .
The cost of a magnet is \$2 less than the cost of a keychain.

- (a) Write an expression for the cost of a magnet.

Answer: _____ [1]

The cost of a t-shirt is \$7 more than twice the cost of a keychain.

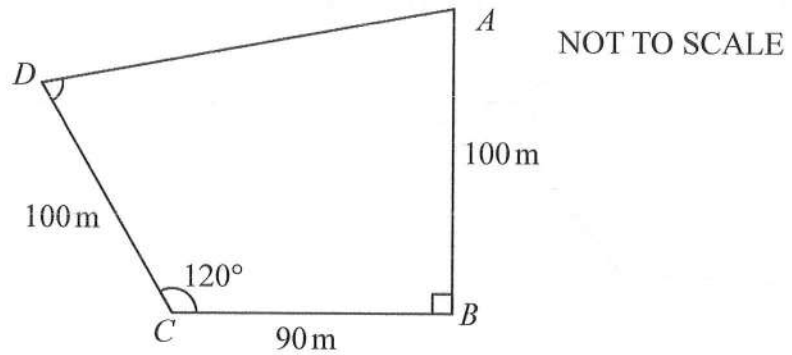
- (b) Write an expression for the cost of a t-shirt.

Answer: _____ [2]

- (c) If the total cost of all three items is \$37, write and solve an equation to find the cost of a keychain.

Answer: \$ _____ [3]

17. A surveyor's diagram shows a plot of land $ABCD$.



- (a) Using a scale of 1 cm to 10 m draw and label an accurate scale drawing of the plot of land. [5]

- (b) From your diagram, give the actual length AD in meters.

Answer: _____ m [2]

- (c) Measure and state the size of $\hat{ADC}$.

Answer: _____ ° [1]



18. Simplify:

(a) $8ab - 15c - 3ab - 6c$

Answer: _____ [2]

(b) $2p \times 3p^2$

Answer: _____ [2]

(c) $\frac{24xy^2}{8xy}$

Answer: _____ [2]

19. (a) A bottle of juice with a regular price of \$5.00 is on special for \$4.65.

Find the percentage discount.

Answer: _____ % [2]

(b) A lamp normally priced at \$250 is sold at a 12% discount.

Find the selling price.

Answer: \$ _____ [2]

(c) The price of a dozen eggs is marked up by 8% due to a shortage.

Find the new price if the regular price was \$4.75 per dozen.

Answer: \$ _____ [2]

[Turn over

20. The table below shows the number of days of rainfall each month in a tropical rainforest for the year 2019.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Days of Rainfall	8	5	7	6	10	15	17	19	17	15	10	9

- (a) State the month with the least days of rainfall.

Answer: _____ [1]

- (b) Find the mean number of days of rainfall.

Answer: _____ [2]

- (c) State the mode or modes for the number of days of rainfall.

Answer: _____ [1]

- (d) Using the information from the table, complete the line graph below [4]



21. A furniture store advertises a living room set for \$4,700 cash price.

This can be purchased on hire purchase detailed below:

- Down payment of \$725
- Simple interest charged on the balance at a rate of 12% per annum for duration of hire purchase.

She completes payment in 2 years.

(a) Calculate the interest charged.

Answer: \$ _____ [3]

The balance plus interest is repaid in equal monthly instalments over the 2 years.

Calculate:

(b) the amount of each monthly instalment,

Answer: \$ _____ [2]

(c) the total cost of the living room set on the hire purchase plan.

Answer: \$ _____ [1]

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MATHEMATICS

PAPER 2 (CORE/EXTENDED) 3815/2

Wednesday **21 MAY 2025** 9:00 A.M.–11:00 A.M.

Additional materials:

Calculator (not graphing)

Geometrical instruments

Answer booklet

Graph paper

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

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Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided on the **answer booklet**.

Remove the graph paper from the question paper. Write your school number, candidate number, surname and initials, signature and date on the graph paper. Place the graph paper in the answer booklet.

Answer **ALL** questions in the answer booklet.

ALL working must be shown.

ALL working must be done in blue or black ink, except for drawings, lines and constructions which may be done in pencil.

INFORMATION FOR CANDIDATES

Calculators may be used. **[NO GRAPHING CALCULATORS ALLOWED]**.

Tracing paper and geometrical instruments may be used.

The mark for each question, or part question, is shown in brackets [].

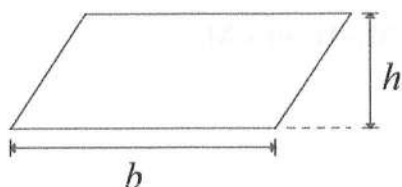
The total number of marks for this paper is 100.

This question paper consists of 8 printed pages.

INFORMATION AND FORMULAE

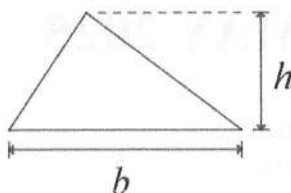
MENSURATION

Parallelogram



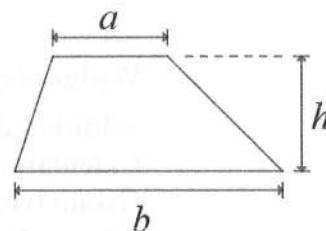
$$\text{Area} = bh$$

Triangle



$$\text{Area} = \frac{1}{2}bh$$

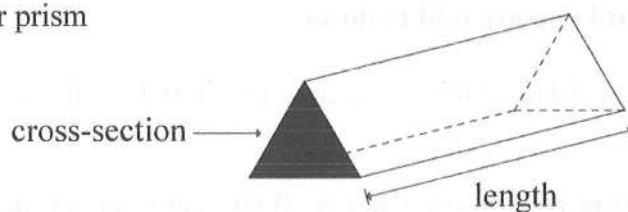
Trapezium



$$\text{Area} = \frac{1}{2}(a+b)h$$

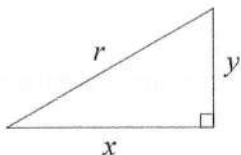
Circle (radius r , diameter d)	Circumference	$2\pi r$ or πd
	Area	πr^2
Cylinder (radius r , height h)	Volume	$\pi r^2 h$
Prism	Volume	area of cross-section $\times$ length

e.g. triangular prism

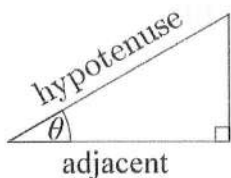


TRIGONOMETRY

Right-angled Triangle:



$$r^2 = x^2 + y^2 \quad (\text{Result of Pythagoras})$$



$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}, \quad \cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}, \quad \tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

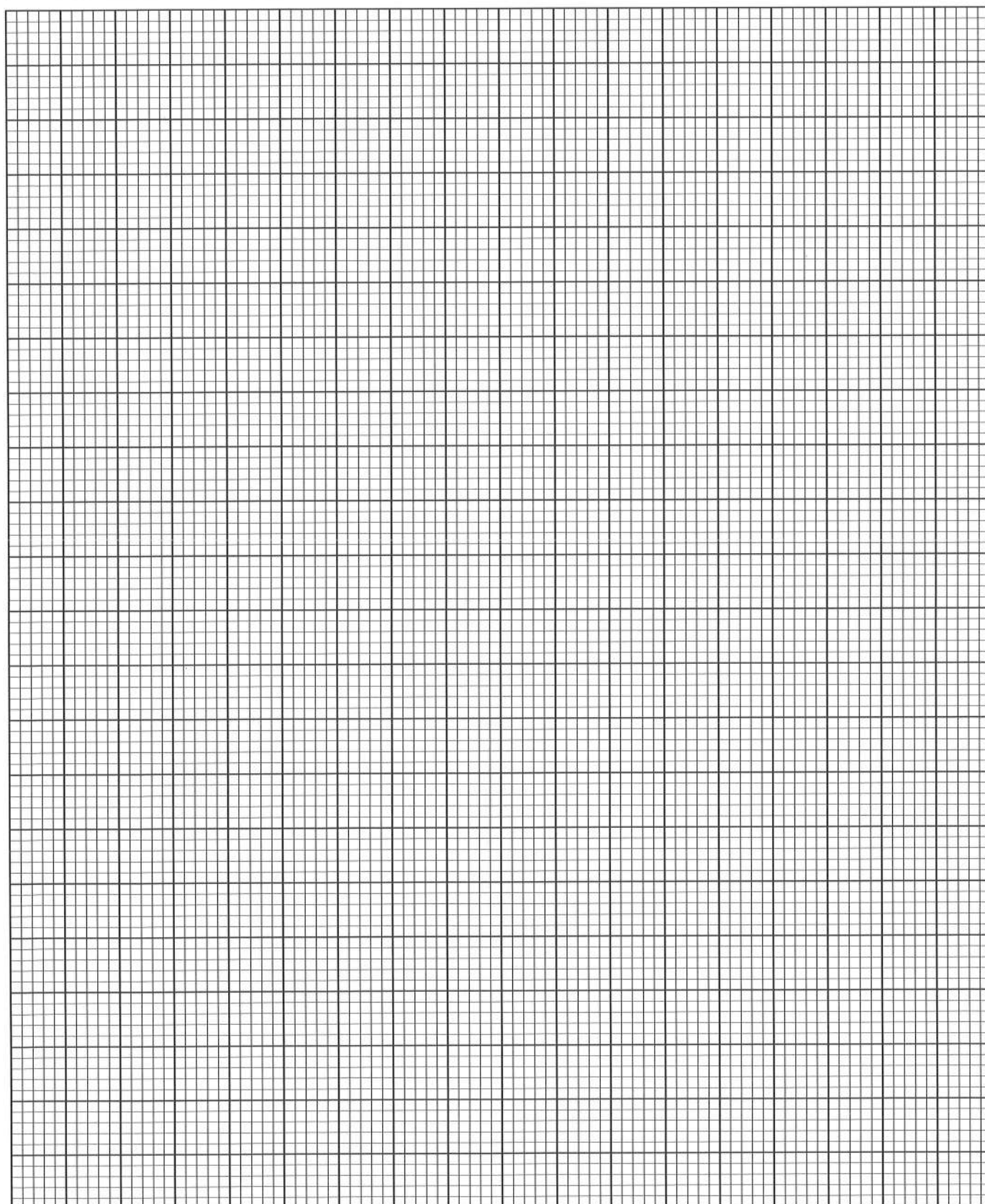


NUMBER

Standard Form is $a \times 10^n$ where $1 \leq a < 10$ and n is an integer.

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EXAMINATION**

School No.	Candidate No.	Level:	For Examiner's Use
Subject Number & Title:		Paper:	
Surname & Initials:		Section:	
Signature:	Date:	Qu. No.	



EXAMINATION

School No.	Candidate No.	Level:	For Examiner's Use
Subject Number & Title:		Paper:	
Surname & Initials:		Section:	
Signature:	Date:	Qu. No.	

[illegible]

1. (a) Given that $M = p^2q - 3p$, find the value of M when $p = -2$ and $q = 3$. [3]

(b) Make q the subject of the formula $M = p^2q - 3p$. [2]

2. Solve $4(x - 3) = 2(x + 8)$. [4]

3. The centre of the Milky Way galaxy is 25,800 light-years from Earth.

1 light-year = 9.461×10^{12} kilometres.

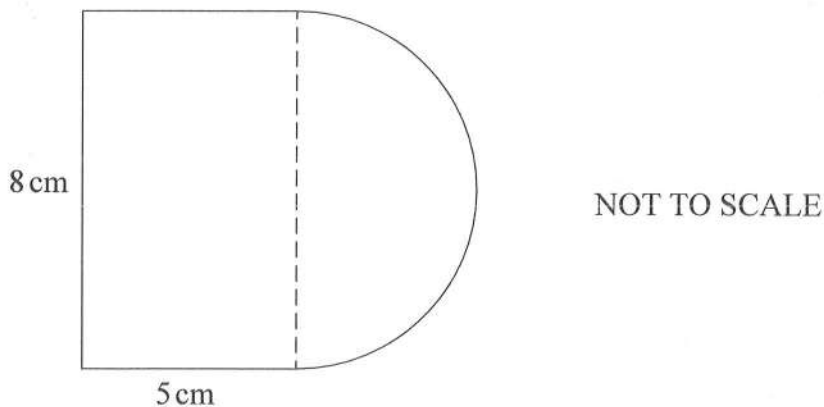
For this problem give all answers in standard form correct to three significant figures.

(a) Find the distance in kilometres (km) between the Earth and the centre of the Milky Way. [2]

The fastest speed obtained by a man-made spacecraft is 586,000 km/h.

(b) Find the time in hours needed to travel one light-year. [3]

4.



The compound figure above comprises a rectangle and a semicircle.

Using $\pi \approx 3.14$ where necessary, find:

(a) the total area of the figure, [4]

(b) the total perimeter of the figure. [3]

5. (a) Solve the inequality $15 - 3x \geq 8x + 7$. [2]

(b) Show the solution to (a) on a number line. [2]

(c) Give the solution set if x is a natural number. [1]

6. Solve the pair of simultaneous equations.

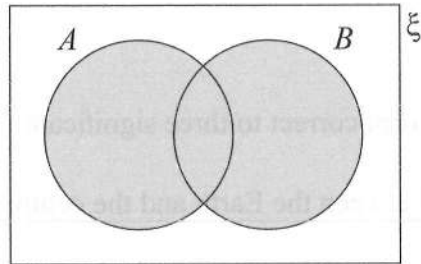
$$2x + 3y = 34$$

$$5x - 7y = -31$$

[5]

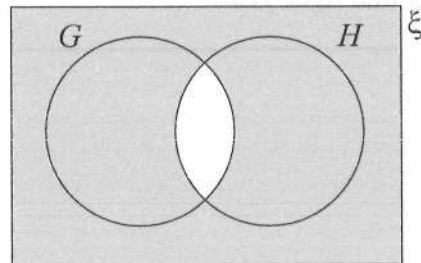
7. Use set symbols to identify the shaded regions:

(a)



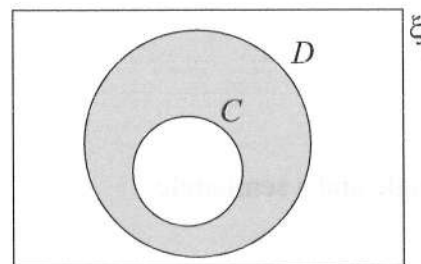
[1]

(b)



[1]

(c)



[1]

8. (a) Simplify the following:

(i) $3(m + 2n) - (m + 3n)$

[4]

(ii) $\left(\frac{a^2}{2b}\right)^3$

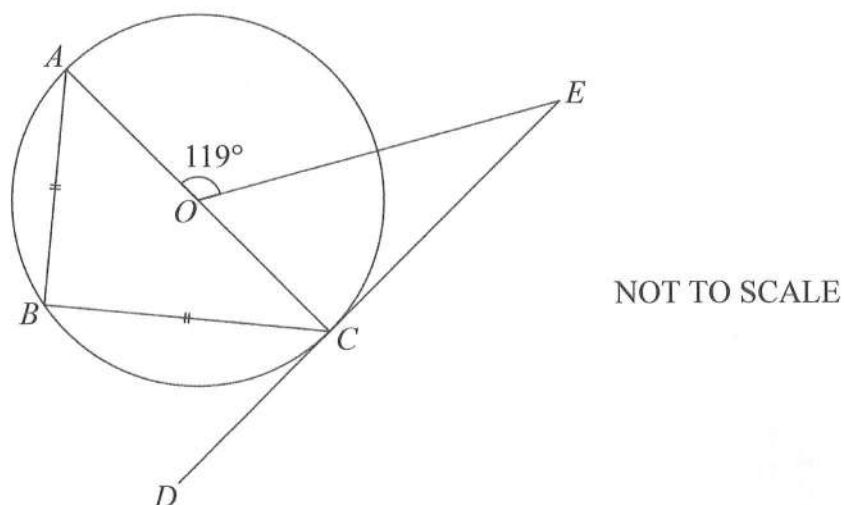
[3]

- (b) Factorise $5a^2b - 10a^2b^2$.

[3]



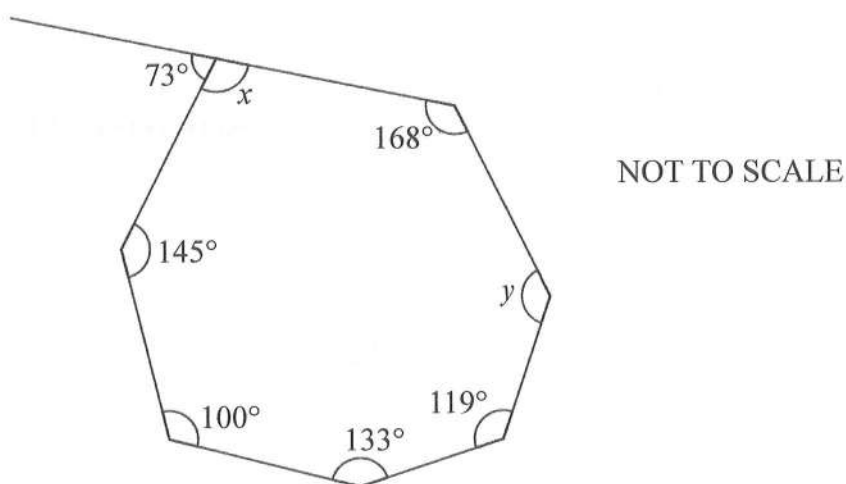
9.



In the diagram, O is the centre of the circle,
 DE is tangent to the circle at C and AC is a diameter.
 Find the sizes of the following angles:

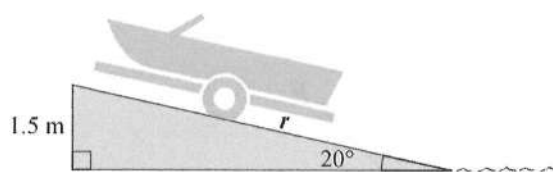
- | | | |
|-----|-------------|-----|
| (a) | $\hat{EOC}$ | [1] |
| (b) | $\hat{OCE}$ | [1] |
| (c) | $\hat{CEO}$ | [1] |
| (d) | $\hat{ABC}$ | [1] |
| (e) | $\hat{BCA}$ | [1] |

10.



- | | | |
|-----|---|-----|
| (a) | Find the sizes of angles x and y . | [3] |
| (b) | The sum of 5 interior angles of an octagon is 639° . If the remaining angles are equal, find the size of each. | [3] |

11.

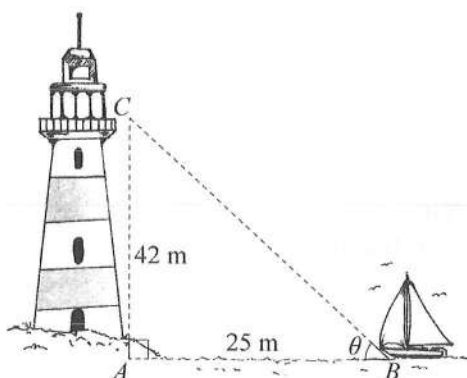


NOT TO SCALE

A boat ramp 1.5 m high is at a slope of 20° .

- (a) Calculate the length (r) of the ramp, correct to 1 decimal place.

[3]



NOT TO SCALE

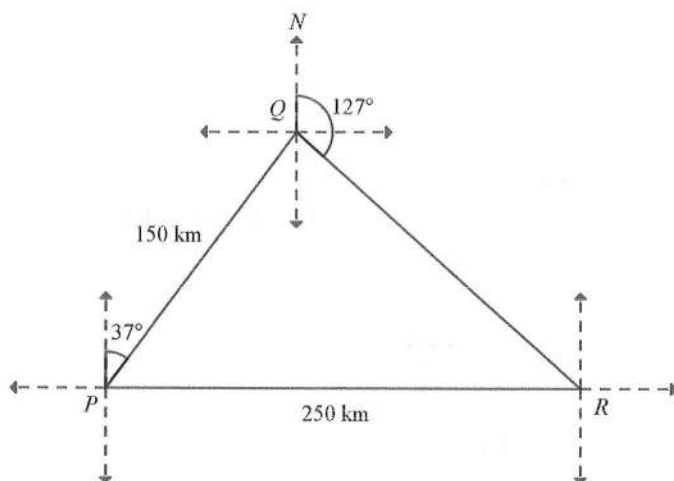
A boat is 25 m offshore as shown above.

C is the lookout point of the lighthouse 42 m above ground.

- (b) Calculate the size of angle θ , correct to the nearest degree.

[3]

12.



NOT TO SCALE

Q is 150 km from P on a bearing of 037° .

R is 250 km due East of P .

R is on a bearing of 127° from Q .

- (a) Show that the interior angle PQR is 90° .

[2]



- (b) State the bearing of P from Q . [1]
- (c) Calculate the distance QR . [3]
- (d) State the bearing of Q from R . [2]

13. A tech company employs 400 web designers.

One lead designer is employed to help ten web designers.

One supervisor is hired for every 20 lead designers.

- (a) Calculate the number of people employed in the company. [2]

A web designer earns \$38 per hour for a 40 hour week.

- (b) Calculate the total wages of all the web designers for a week. [3]

Each lead designer is paid \$2,250 per week.

- (c) Calculate their total wages for the week. [2]

The total weekly wage package for this company is \$704,000.

- (d) Calculate the weekly pay for each supervisor. (Each is paid the same amount). [3]

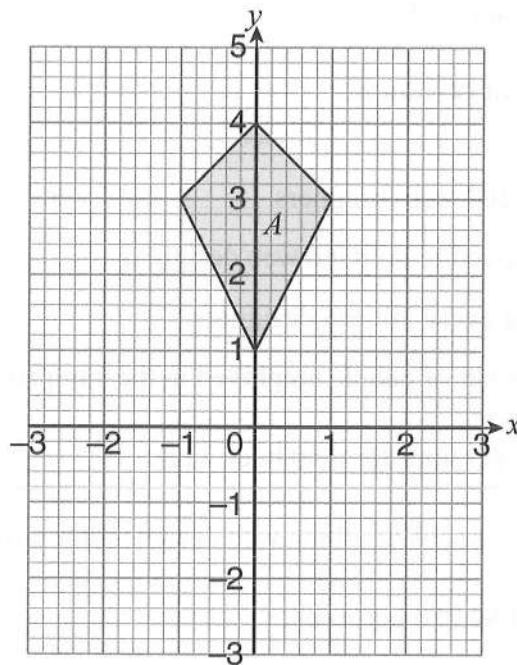
14. **ANSWER THIS ENTIRE QUESTION ON THE GRAPH PAPER PROVIDED.**

The table below gives values for the **two** given equations.

x	-6	0	2	6
$y = \frac{8-x}{2}$	7	4	b	1
$y = \frac{x+12}{2}$	a	6	7	9

- (a) Find the values of a and b . [2]
- (b) Using a scale of 1 cm to 1 unit on both axes, for $-8 \leq x \leq 8$ and $-2 \leq y \leq 10$, draw and label the graphs of the two equations. [5]
- (c) Write the coordinates of the point where the lines intersect. [1]
- (d) State the gradient of the line $y = \frac{8-x}{2}$. [1]

15. ANSWER THIS ENTIRE QUESTION ON THE GRAPH PAPER PROVIDED.



- (a) Using a scale of 1 cm to 1 unit on both axes, with $-8 \leq x \leq 8$ and $-5 \leq y \leq 13$, copy the diagram showing the kite A . [2]
- (b) Draw and label the following transformations:
- (i) Rotate A 180° about the origin. Label the image B . [2]
 - (ii) Reflect A in the line $x = -3$. Label the image C . [2]
 - (iii) Enlarge A by a scale factor of 3, with the centre the origin. Label the image D . [3]
 - (iv) Translate A with a displacement vector $\begin{pmatrix} 6 \\ 0 \end{pmatrix}$. Label the image E . [2]
- (c) Shape A can be reflected onto shape B . State the equation of the line of reflection. [1]



MATHEMATICS

PAPER 3 (CORE/EXTENDED) 3815/3

Monday **26 MAY 2025** 9:00 A.M.–11:30 A.M.

Additional materials:

Calculator (not graphing)	Answer booklet
Geometrical instruments	Graph paper

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INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, Surname and Initials in the spaces provided on each **answer booklet**.

Remove the graph paper from the question paper. Write your school number, candidate number, surname and initials, signature and date on the graph paper. Place the graph paper in the answer booklet.

Answer **ALL** questions in the answer booklet.

ALL working must be shown.

ALL working must be done in blue or black ink, except for drawings, lines and constructions which may be done in pencil.

INFORMATION FOR CANDIDATES

Calculators may be used. **[NO GRAPHING CALCULATORS ALLOWED].**

Tracing paper and geometrical instruments may be used.

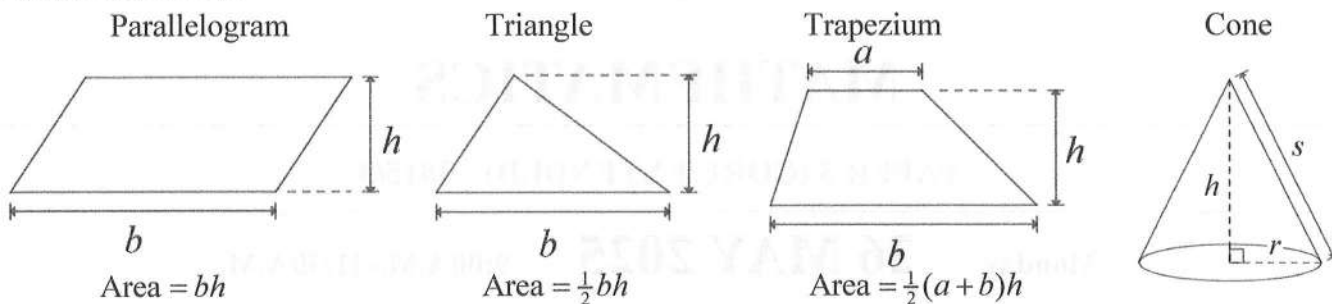
The mark for each question, or part question, is shown in brackets [].

The total number of marks for this paper is 100.

This question paper consists of 8 printed pages.

INFORMATION AND FORMULAE

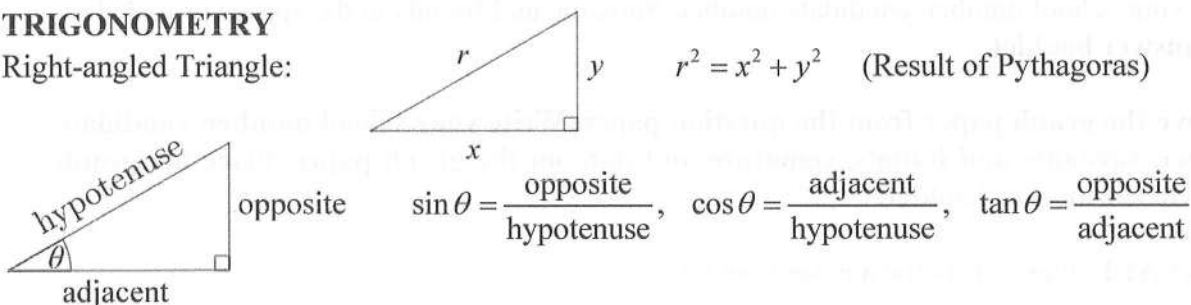
MENSURATION



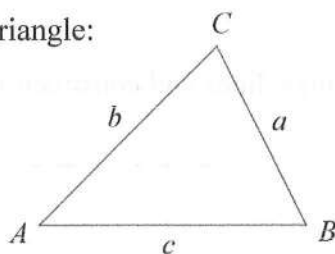
Circle (radius r , diameter d)	Circumference	$2\pi r$ or πd
	Area	πr^2
Cylinder (radius r , height h)	Volume	$\pi r^2 h$
	Area of curved surface	$2\pi rh$
Sphere (radius r)	Volume	$\frac{4}{3}\pi r^3$
	Area of curved surface	$4\pi r^2$
Prism	Volume	area of cross-section $\times$ length
Pyramid	Volume	$\frac{1}{3} \times \text{area of base} \times \text{height}$
Cone (radius r , height h)	Volume	$\frac{1}{3}\pi r^2 h$
	Area of curved surface	πrs where slant height $s = \sqrt{h^2 + r^2}$

TRIGONOMETRY

Right-angled Triangle:



Any Triangle:



In any triangle ABC :

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

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

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

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

NUMBER Standard Form is $a \times 10^n$ where $1 \leq a < 10$ and n is an integer.

ALGEBRA The quadratic equation $ax^2 + bx + c = 0$ has solutions $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

The determinant of matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is $ad - bc$.

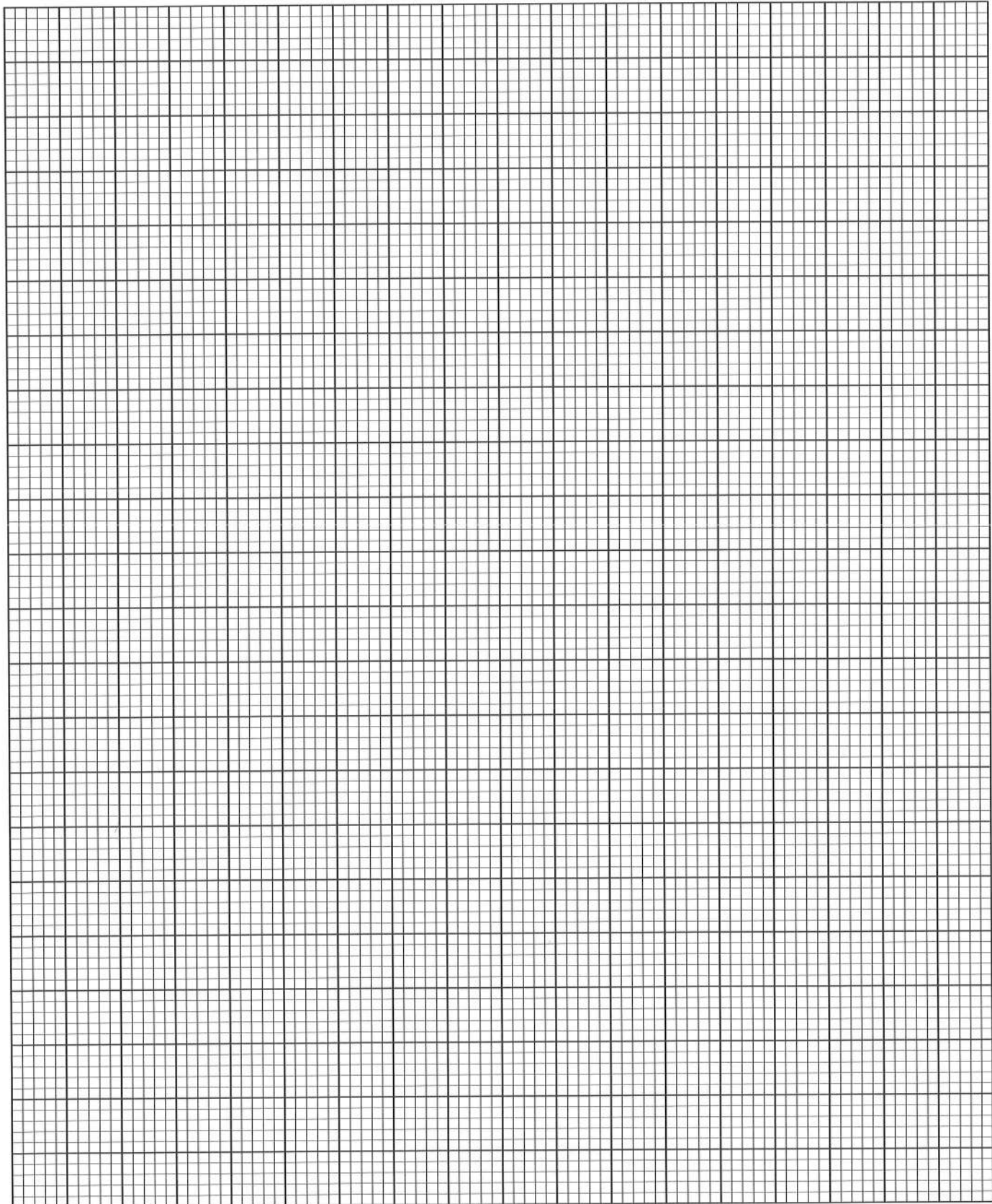
The inverse of $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is $\frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

If $y = ax^n$, then $\frac{dy}{dx} = anx^{n-1}$



MINISTRY OF EDUCATION
BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION
EXAMINATION

School No.	Candidate No.	Level:	For Examiner's Use
Subject Number & Title:		Paper:	
Surname & Initials:		Section:	
Signature:	Date:	Qu. No.	



EXAMINATION

School No.	Candidate No.	Level:	For Examiner's Use
Subject Number & Title:		Paper:	
Surname & Initials:		Section:	
Signature:	Date:	Qu. No.	

This image shows a full page of blank graph paper. The grid consists of small, equal-sized squares formed by thin black lines. There are no margins, text, or other markings on the paper.

1. \$4750 earns \$1068.75 simple interest when invested for 4 years 6 months.
Calculate the rate percent per annum. [3]
-

2. The sum of the interior angles of a regular polygon is $2,340^\circ$.
Determine the size of an exterior angle. [4]
-

3. (a) Find the values of x and y given the operation $\begin{pmatrix} 2 & 3 \\ y & -2 \end{pmatrix} \begin{pmatrix} 1 \\ -4 \end{pmatrix} = \begin{pmatrix} x \\ 2 \end{pmatrix}$. [4]
- (b) If the matrix $\begin{pmatrix} 4 & n \\ -1 & 1 \end{pmatrix}$ has a determinant of 10, find the value of n . [2]
-

4. The number of expected views of an influencer's content can be calculated using the formula $v = 1,000 + 3^d$ where v is the number of views and d is the number of days the content is published.
- (a) Calculate the expected number of views after 7 days. [1]
- (b) Determine how many days it will take for the expected number of views to reach 60,049. [3]
-

5. The sales agents in a store earn \$260 per week plus 8% commission on sales over \$500.
In a certain week one agent sells goods valued at \$1630.
- (a) Calculate his gross pay for that week. [3]
- After a busy week, another agent's gross pay that week was \$436.
- (b) Calculate the value of the goods she sold that week. [4]
-

6. Simplify $\frac{4}{x-3} - \frac{2}{x+1}$ [4]
-

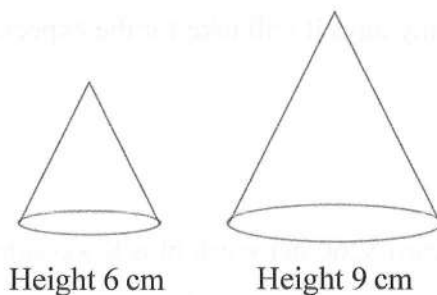
7. (a) Factorise completely
- (i) $2ax - bx + 12ay - 6by$ [3]
- (ii) $x^2 - 36y^2$ [2]
- (b) Hence, simplify $\frac{x^2 - 36y^2}{2ax - bx + 12ay - 6by}$ [2]
-

8. Make m the subject of the formula $b = \frac{1 - am^2}{1 + m^2}$ [5]
-

9. Given the curve with equation $y = 3x^2 - 4x + 1$ and the point $P(2, 5)$ on the curve, find
- (a) the gradient of the curve at P , [2]
- (b) the equation of the tangent to the curve at P . [3]
-

10. The points $(2, y)$ and $(3, 7)$ are on a straight line. If the gradient of the line is 4, find the value of y . [3]
-

11.



Two similar cones are shown.

The surface area of the larger cone is 54 cm^2 .

- (a) Find the surface area of the smaller cone. [2]

The volume of the smaller cone is 24 cm^3 .

- (b) Find the volume of the larger cone. [2]
-



12. Upon getting home, an eccentric teacher uses a spinner to decide which of four activities to do. The probability of the spinner landing on each activity is shown below.

Activity	Probability
Read a book	0.2
Watch TV	0.1
Grade papers	0.4
Do housework	0.3

- (a) Find the probability that the teacher does not watch TV. [1]

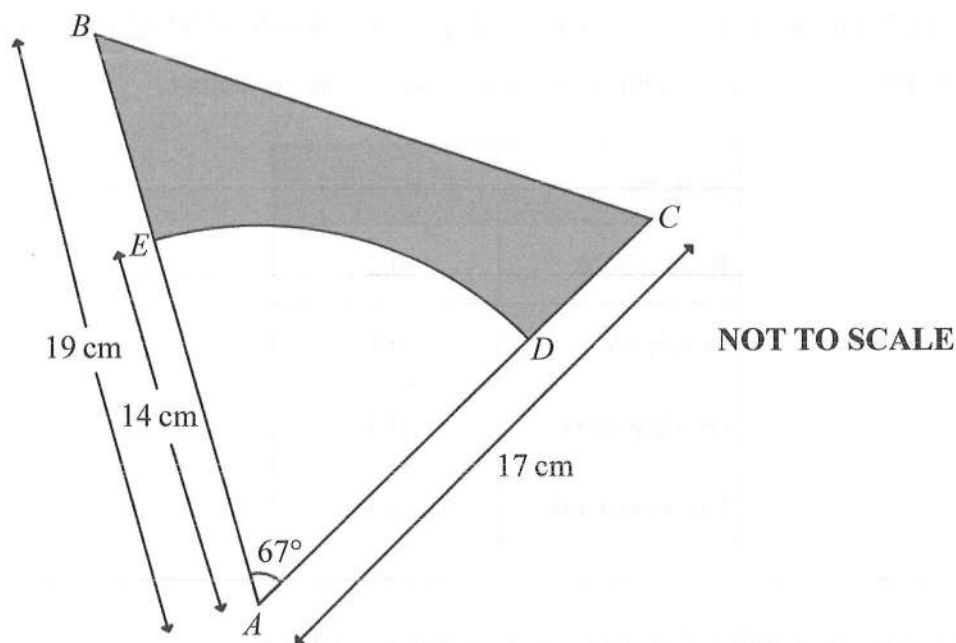
One evening, the teacher decides on two activities using the spinner.

- (b) Find the probability that the teacher
- (i) watches TV then reads a book, [2]
- (ii) grades papers and does housework, in any order. [3]

-
13. The function $f(x) = \frac{2}{x}$ and the function $g(x) = 2x - 3$.

- (a) Find $gf(4)$. [2]
- (b) Find the values of x for which $f(x) = g(x)$. [5]
-

14.



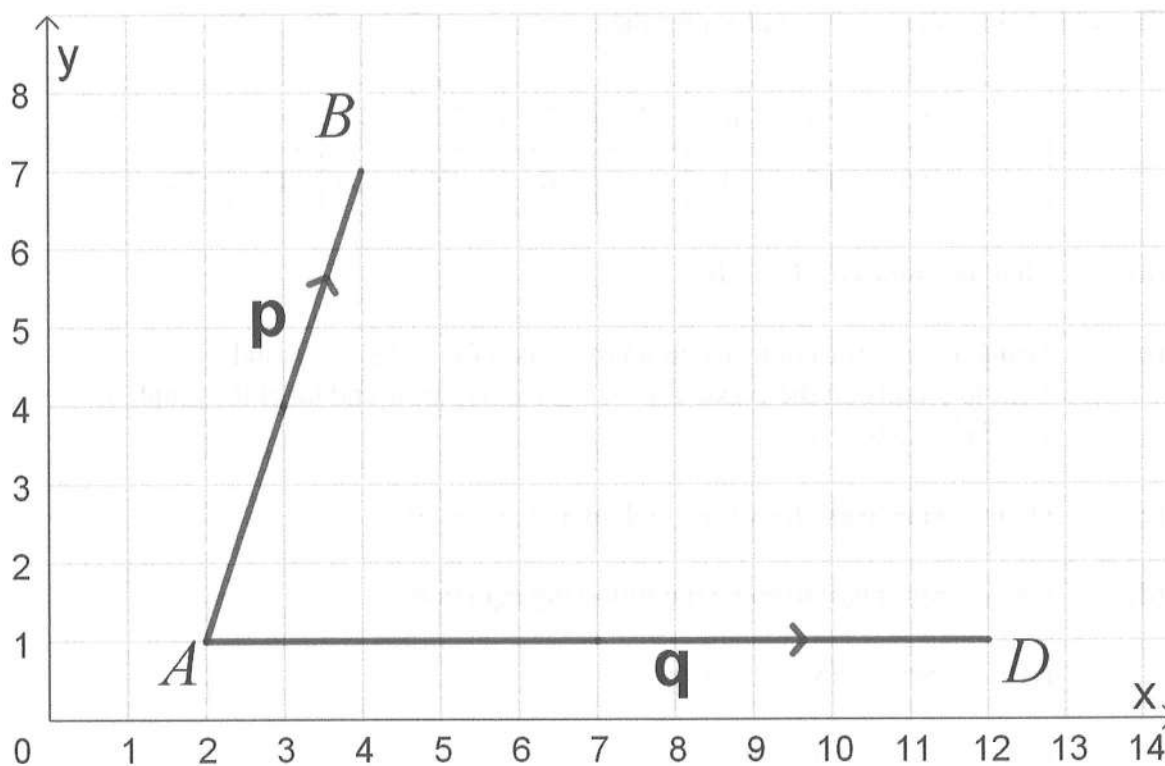
In the diagram, ABC is a triangle and ADE is a sector.

Find correct to the nearest whole number,

- (a) the area of triangle ABC , [2]
- (b) the area of sector ADE , [2]
- (c) the area of shaded region $BCDE$, [1]
- (d) the length BC , [4]
- (e) the size of angle ABC . [3]



15. ANSWER THIS ENTIRE QUESTION ON THE GRAPH PAPER PROVIDED.



The diagram shows a part of a parallelogram $ABCD$.

$AB = \mathbf{p}$ and $AD = \mathbf{q}$.

(a) Using a scale of 1 cm to 1 unit on each axis for $0 \leq x \leq 16$ and $0 \leq y \leq 16$, draw and label the vectors shown onto your graph paper. [3]

(b) Plot the point C and complete the parallelogram $ABCD$. [2]

N lies on BC such that $BN = \frac{2}{5}BC$.

(c) Mark and label the point N . [1]

(d) Write $\overrightarrow{AC}$ in terms of $\mathbf{p}$ and $\mathbf{q}$. [1]

(e) Write $\overrightarrow{ND}$ as a column vector. [1]

Point X lies on AB produced such that $AX = 2AB$.

(f) (i) Mark the point X . [1]

(ii) Write $\overrightarrow{XN}$ in terms of $\mathbf{p}$ and $\mathbf{q}$. [2]

16. **ANSWER THIS ENTIRE QUESTION ON THE GRAPH PAPER PROVIDED.**

The table below shows some values for the equation $y = 5x^2 - 20x - 10$.

x	-2	-1	0	1	2	3	4	5	6
y	50	15	A	-25	B	-25	-10	15	50

- (a) Find the values of A and B . [2]
- (b) Using a scale of 2 cm to 1 unit on the x -axis for $-2 \leq x \leq 6$ and 1 cm to 5 units on the y -axis for $-35 \leq y \leq 60$, draw and label the graph of $y = 5x^2 - 20x - 10$. [4]
- (c) On the same axes, draw the graph of $y = 5x + 20$. [2]
- (d) Use your graph(s) to solve the following equations:
- (i) $5x^2 - 20x - 10 = 0$ [2]
- (ii) $5x^2 - 20x - 10 = 5x + 20$ [2]

