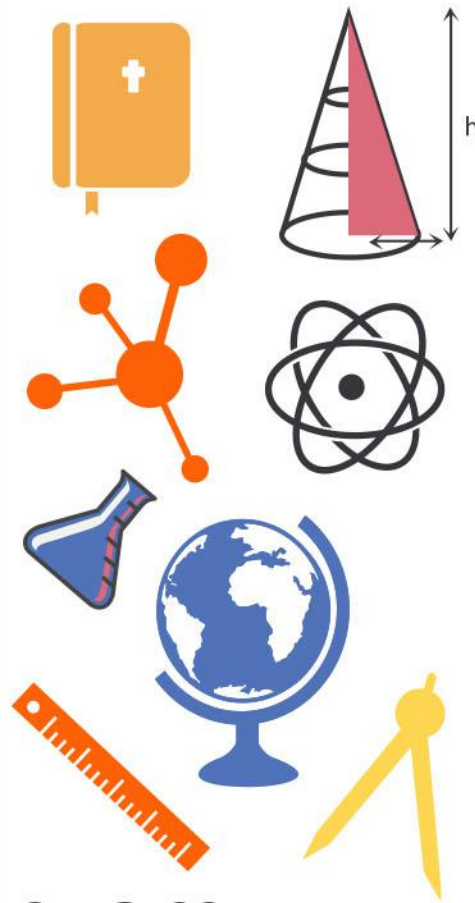
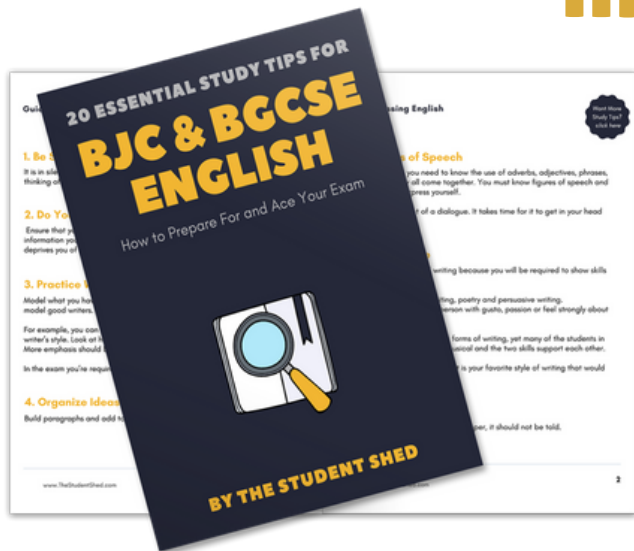


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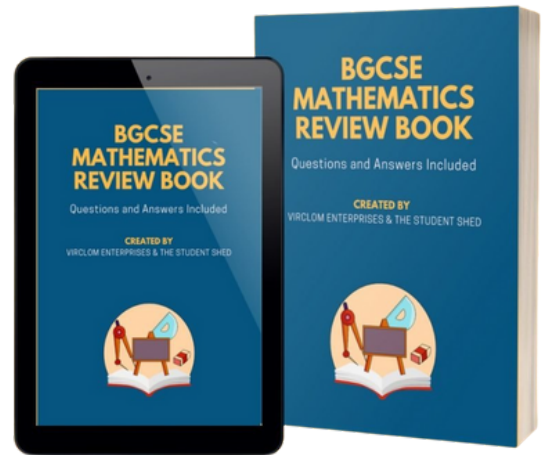


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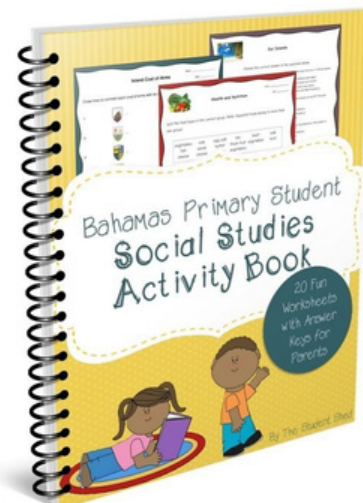
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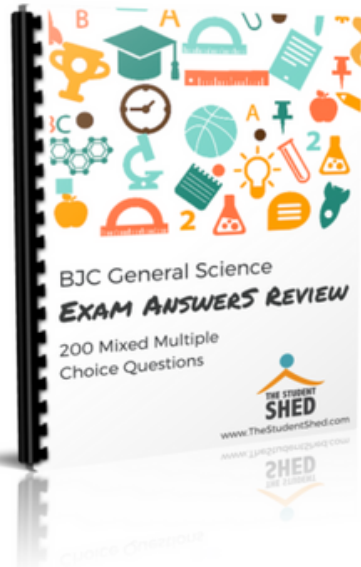
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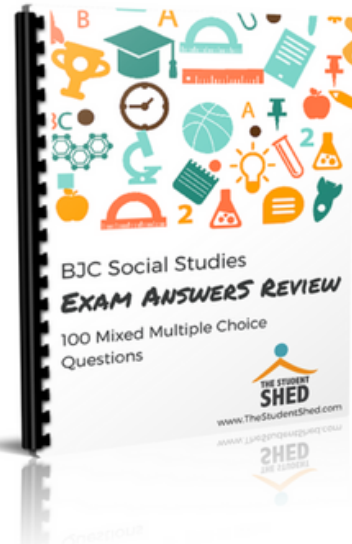
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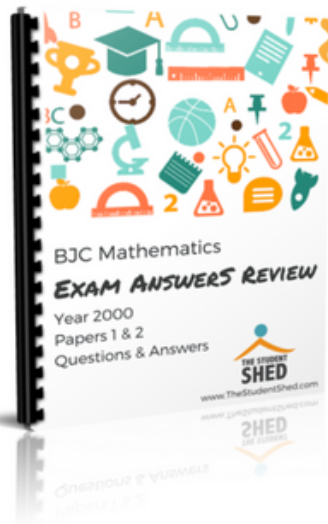
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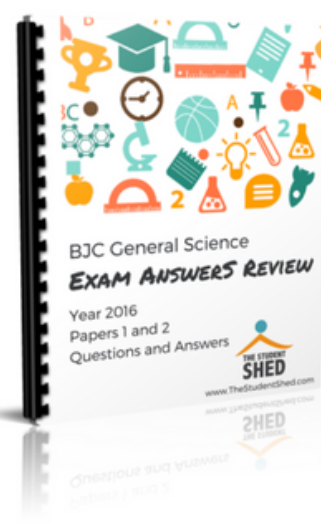
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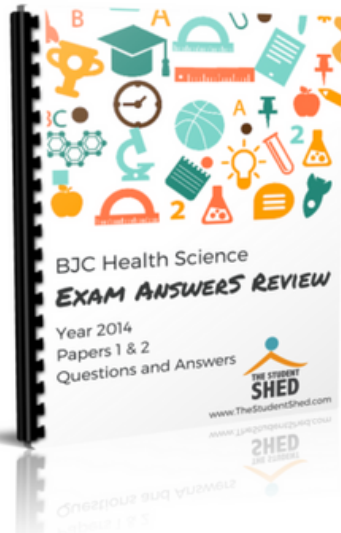
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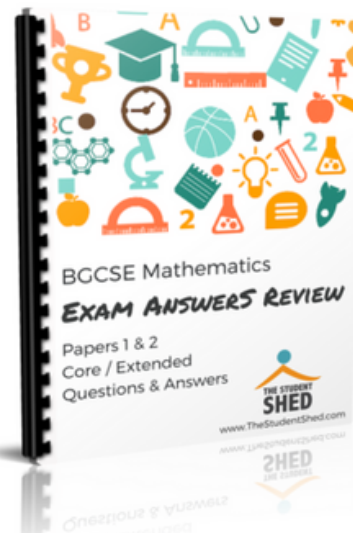
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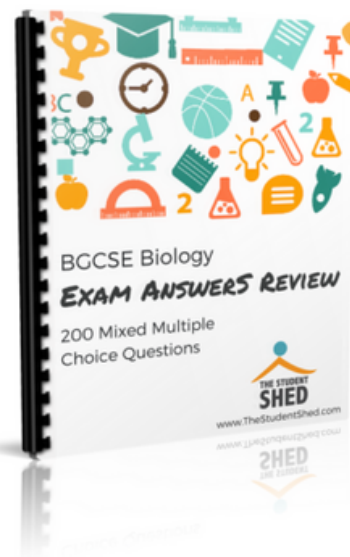
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School Number	Candidate Number
Surname and Initials	

MATHEMATICS

PAPER 1 (CORE/EXTENDED) 3815/1

Thursday **18 MAY 2023** 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.

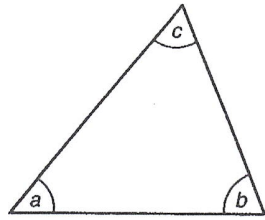
The mark for each question, or part question, is shown in brackets [].

The total number of marks for this paper is 100.

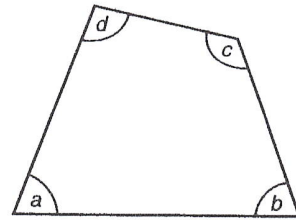


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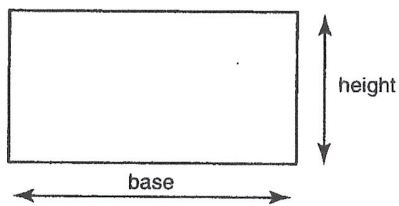
INFORMATION AND FORMULAE



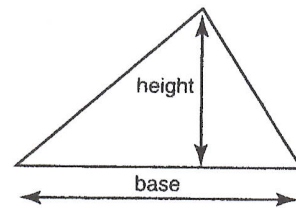
Angle sum of triangle
 $a + b + c = 180^\circ$



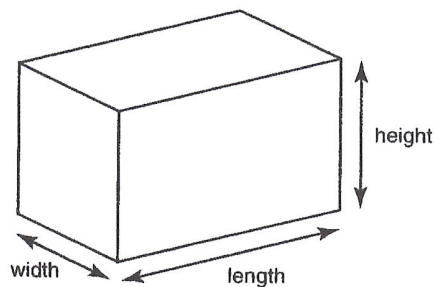
Angle sum of quadrilateral
 $a + b + c + d = 360^\circ$



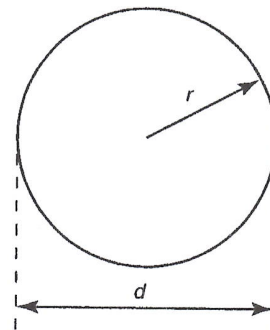
Area of rectangle = base $\times$ height



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. Write down the next two terms in the sequence.

2, 9, 17, 26, 36, _____, _____.

[2]

2. Kevin can buy 8 erasers for \$2.16.

Work out the cost of 10 of these erasers.

Answer: \$ _____ [2]

3. (a) Find the exact value of $\frac{3,675 \times 15}{16}$.

Answer: _____ [1]

- (b) Write the answer for part (a) correct to

(i) the nearest 100, Answer: _____ [1]

(ii) 3 decimal places, Answer: _____ [1]

(iii) 3 significant figures. Answer: _____ [1]

4. Convert the following to the units indicated.

(a) 320 g = _____ kg [1]

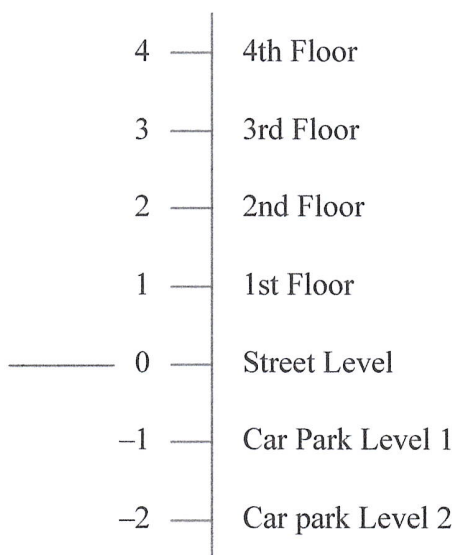
(b) 4.2 m = _____ cm [1]

(c) 0.8 l = _____ ml [1]



[Turn over]

5.



The diagram shows the elevator service of a building.

Jade parks at Car Park Level 2 and takes the elevator up five floors to go to a meeting. She then takes the elevator down two floors to have lunch.

Write down which floor Jade has lunch on.

Answer: _____ [1]

6. Mr. Jones starts watching a new television series.

One evening he watches the series from 7:19 p.m. until 12:05 a.m.

(a) Calculate how long he spends watching the series that evening.

Answer: _____ [2]

The next day he starts watching one episode of the series at 8:15 a.m.
The episode lasts 48 minutes.

(b) Calculate the time he finishes the episode.

Answer: _____ [2]

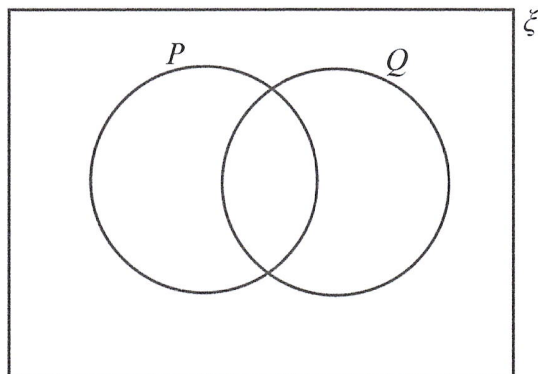
(c) Write 7:19 p.m. using the 24-hour clock.

Answer: _____ [1]



7. $\xi = \{x \text{ is an integer: } 20 \leq x < 30\}$
 $P = \{\text{multiples of } 3\}$
 $Q = \{\text{even numbers}\}$

(a)



Complete the Venn-diagram to show the above information.

[4]

(b) List the set P .

Answer: {_____} [1]

(c) Find $n(Q)$.

Answer: _____ [1]

-
8. Ashley wants to buy a video game which costs \$39.95.

She saved:

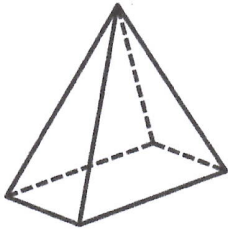
3 \$5 notes,
12 \$1 notes,
23 25¢ coins.

Determine if Ashley has enough money to buy the video game.
Show working to support your answer.

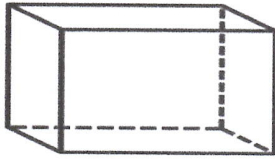
Answer: _____ [3]

[Turn over

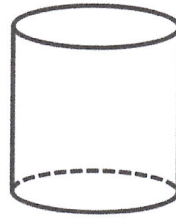
9. Write the name of each of the solids.



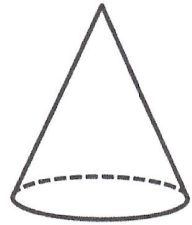
(a) _____



(b) _____



(c) _____



(d) _____ [4]

10. There are 36 jellybeans in a jar.

14 are red,
9 are blue,
6 are yellow,
the rest are green.

Ashley takes a jellybean at random from the jar.

Calculate the probability that it will be

- (a) blue,

Answer: _____ [1]

- (b) purple,

Answer: _____ [1]

- (c) green,

Answer: _____ [2]

- (d) yellow or red.

Answer: _____ [1]



11. Thrifty's Store sells a pack of 16 rolls of toilet paper for \$5.12.
Cheapo's Store sells a pack of 18 rolls of toilet paper for \$6.30.

Determine which store has the better deal on the toilet rolls.

Show working to support your answer.

Answer: _____ [3]

12. In class 10B, the ratio of girls to boys is 4:1.
There are 30 students in class 10B.

(a) Work out the number of girls in class 10B.

Answer: _____ [2]

The ratio of girls to boys in class 10C is 3:2.
There are 14 boys in the class.

(b) (i) Work out the number of girls in class 10C.

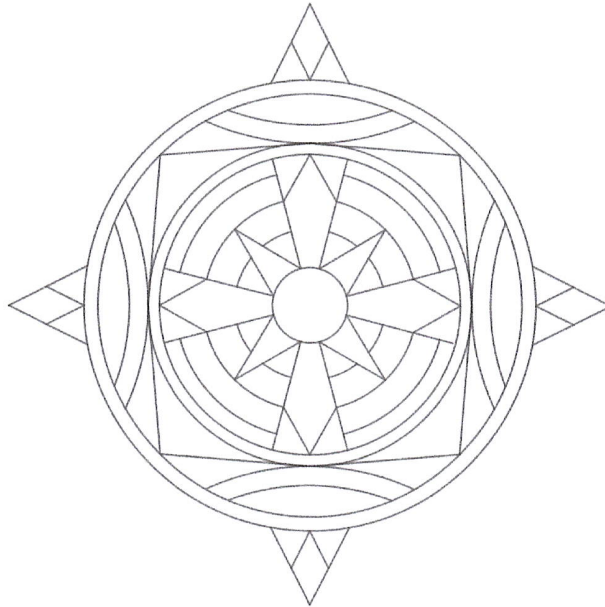
Answer: _____ [2]

(ii) Write down, in simplest form, the ratio of girls to the total number of students in class 10C.

Answer: _____ [1]

[Turn over]

13. The shape below is a design from a Junkanoo costume.



- (a) Draw the lines of symmetry. [3]
- (b) State the order of rotational symmetry.

Answer: _____ [1]

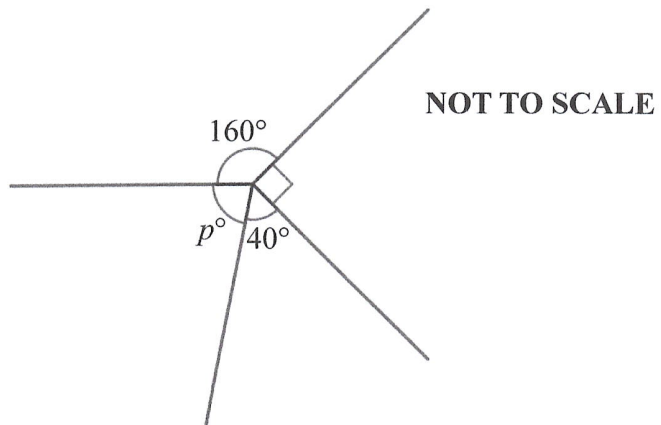
14. There are two traffic lights at different intersections.
The first light turns green every 60 seconds.
The second light turns green every 45 seconds.
At a certain point, both lights turn green at the same time.
Find how many seconds it takes for both lights to turn green at the same time again.
Show working to support your answer.



Answer: _____ [3]

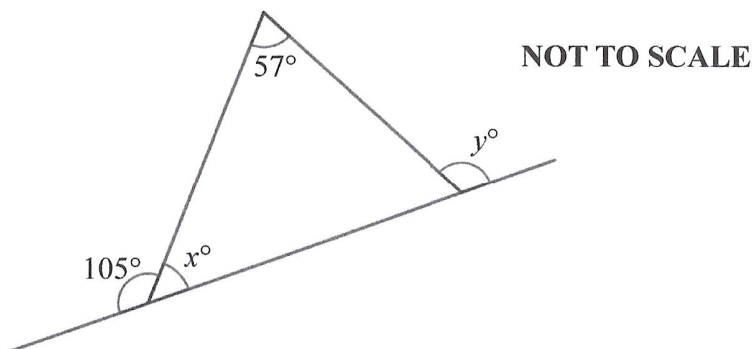
15. Find the lettered angles in the diagrams below.

(a)



$$p = \text{_____}^\circ \text{ [1]}$$

(b)

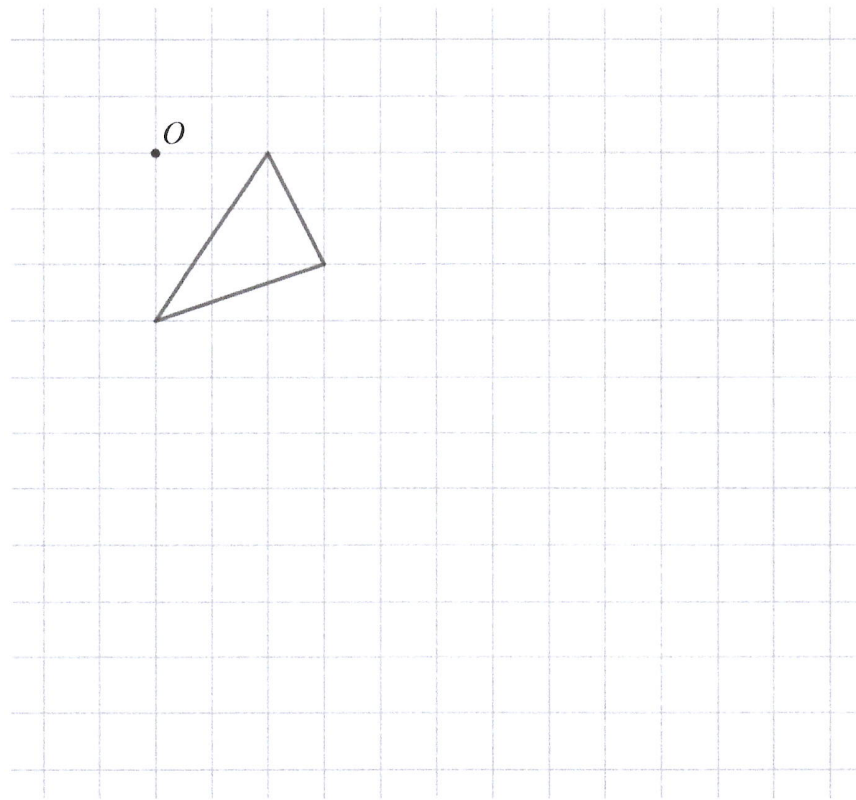


$$x = \text{_____}^\circ \text{ [1]}$$

$$y = \text{_____}^\circ \text{ [2]}$$

[Turn over

16.



Draw an enlargement of the figure above with centre O , using a scale factor of 3.

[3]

17. Solve the following equations.

(a) $3a + 4a - 5a = 15$

Answer: _____ [2]

(b) $\frac{5}{4}n + 6 = 41$

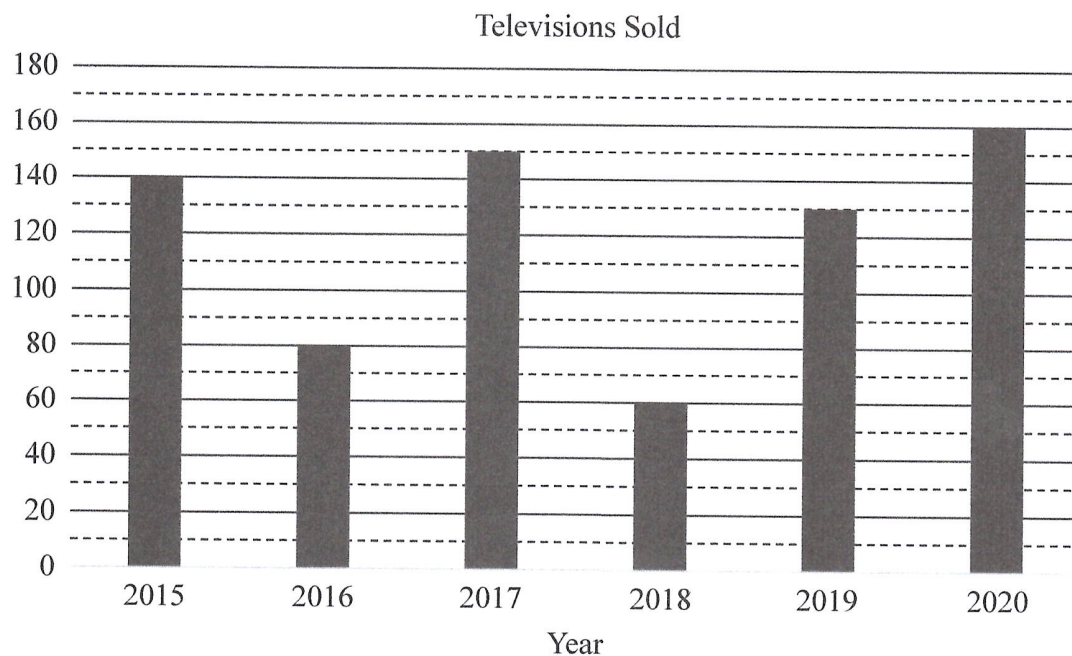
Answer: _____ [2]

(c) $3(x - 9) = 62$

Answer: _____ [3]



18. The chart below shows the sales of television sets at a local appliance store over a period of six years.



- (a) Write down the

(i) number of televisions sold in 2017,

Answer: _____ [1]

(ii) year in which the most televisions were sold,

Answer: _____ [1]

(iii) year(s) where less than 100 televisions were sold.

Answer: _____ [1]

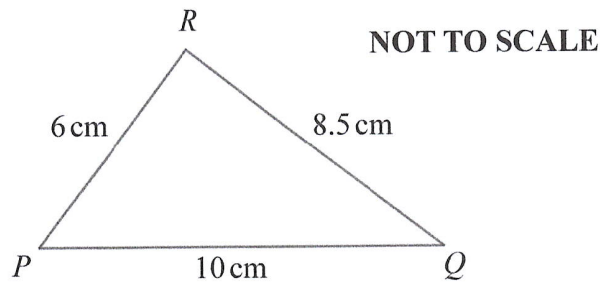
- (b) Find the difference between the number of televisions sold in 2019 and 2016.

Answer: _____ [2]



[Turn over

19. Below is a sketch of triangle PQR .



- (a) Using a ruler and compasses, construct triangle PQR on the line below. [4]

Do not erase construction lines and/or arcs.



- (b) Using the triangle constructed in (a), measure and write down the size of angle PRQ .

Answer: _____ [1]



20. The advertisement below shows the weekly special at KS Techtronic's.

<u>Weekly Special</u> 10-inch Tablet – \$229.75 Headphones – \$49.50 *Purchase both and receive a 4% discount.*
--

A customer purchases both items to receive the discount.
Calculate the amount the customer pays.

Answer: \$ _____ [3]

21. Simplify:

(a) $3x^3 - 5x^2 + x^3 + 8x^2$

Answer: _____ [2]

(b) $\frac{3x}{4} + \frac{x}{5} + \frac{1}{2}$

Answer: _____ [3]

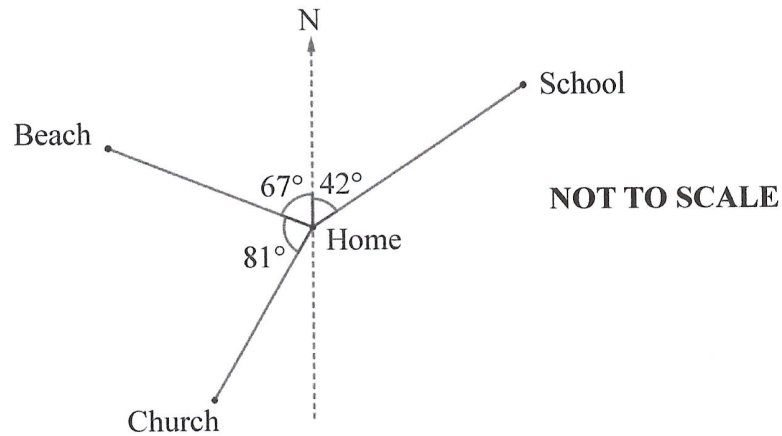
(c) $\frac{9ab}{2} \div \frac{3a^2b}{7}$

Answer: _____ [3]



[Turn over

22. The diagram below shows the direction of three locations from Erin's home.



Find the bearing of

- (a) school from home,

Answer: _____ $^\circ$ [1]

- (b) church from home,

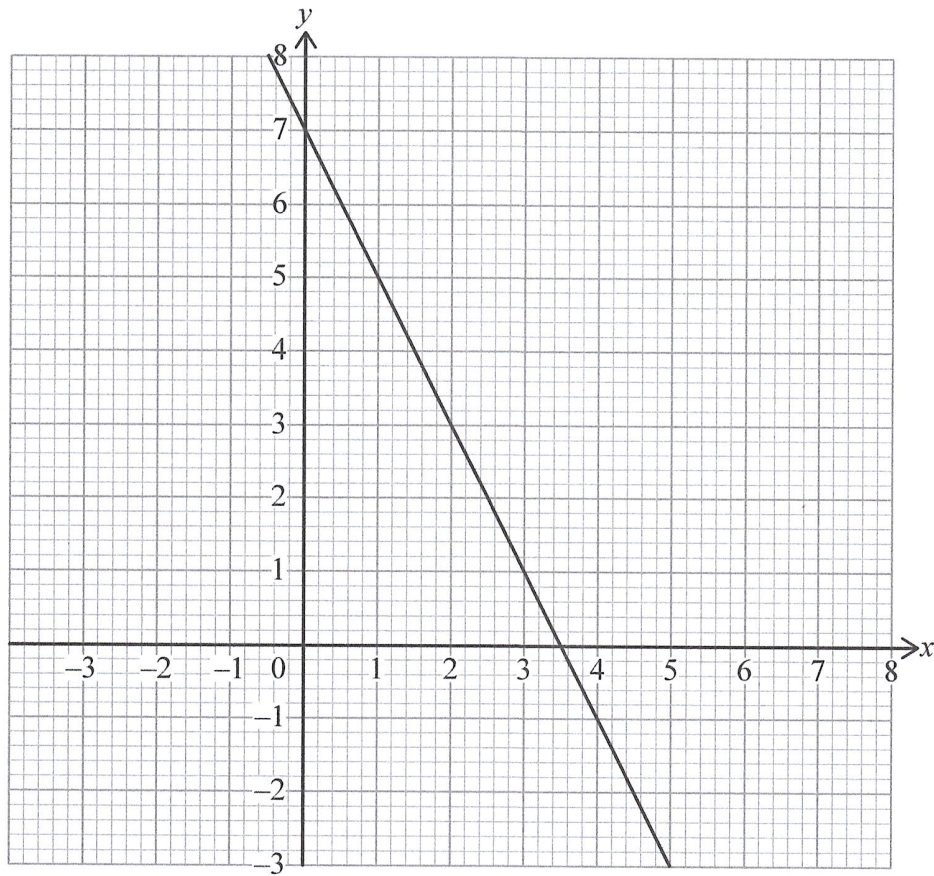
Answer: _____ $^\circ$ [2]

- (c) home from school.

Answer: _____ $^\circ$ [3]



23.



- (a) Write down the y-intercept of the line.

Answer: _____ [1]

- (b) Find the gradient of the line.

Answer: _____ [2]

- (c) Draw the line $y = 5$.

[1]

- (d) Write down the coordinates where the lines intersect.

Answer: _____ [1]



24. A car is listed at a cash price of \$18,000.

A hire purchase plan includes:

- a 20% down payment on the cash price
- *monthly* payments of \$675 for *two years*.

Calculate the total hire purchase cost of the car.

Answer: \$ _____ [4]



MATHEMATICS

PAPER 2 (CORE/EXTENDED) 3815/2

Friday **19 MAY 2023** 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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INSTRUCTIONS TO CANDIDATES

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

Remove the graph paper from the question paper. Close the question paper.

Write your School Number, Candidate Number, Surname and Initials in the spaces provided on the answer booklet **AND** 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.

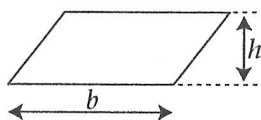


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INFORMATION AND FORMULAE

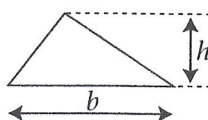
MENSURATION

Parallelogram



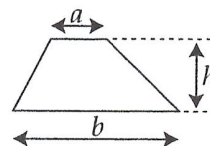
$$\text{Area} = bh$$

Triangle



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

Trapezium



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

Circle (radius r , diameter d)

$$\text{Circumference} = 2\pi r \text{ or } \pi d$$

$$\text{Area} = \pi r^2$$

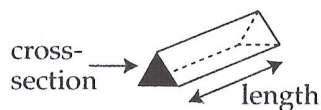
Cylinder (radius r , height h)

$$\text{Volume} = \pi r^2 h$$

Prism

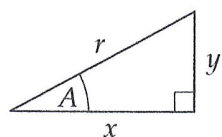
$$\text{Volume} = \text{area of cross-section} \times \text{length}$$

e.g. triangular prism

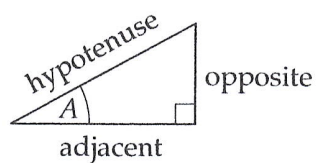


TRIGONOMETRY

Right-angled triangle



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



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

NUMBER

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



1. A college sent out 3,150 invitations to their summer graduation.
5,000 invitations were sent out last year.

Find the percentage decrease in invitations sent. [2]

2. (a) Represent each sentence as an algebraic inequality.

(i) x is at most 69. [1]

(ii) y is at least 100. [1]

(iii) The minimum value of z is 25. [1]

(b) Draw a number line showing the inequality $n \geq 2$. [2]

3. There are several t-shirts on a rack in a store.

$\frac{2}{3}$ are white.

$\frac{1}{8}$ are pink.

All the remaining t-shirts are blue.

(a) Find the fraction of t-shirts that are blue. [2]

There are 20 blue t-shirts on the rack.

(b) Find the total number of t-shirts on that rack. [2]

4. A fisherman has 10 groupers for sale.
The mean weight of the 10 groupers is 14 kg.
He sells two groupers that weigh a total of 32 kg.

Find the mean weight of the remaining groupers. [3]

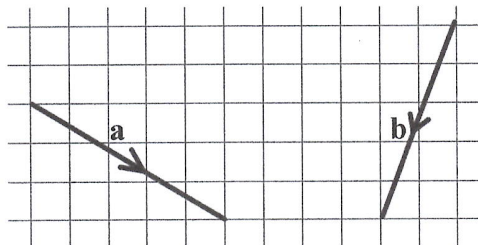
5. The interior angle of a regular polygon is 162° .

(a) Calculate the size of each exterior angle. [1]

(b) Calculate the number of sides of the polygon. [1]



6. Two vectors **a** and **b** are shown on the grid below.



Write as column vectors:

- | | | |
|-----|---------|-----|
| (a) | a and b | [2] |
| (b) | a + b | [2] |
| (c) | 2a | [1] |
-

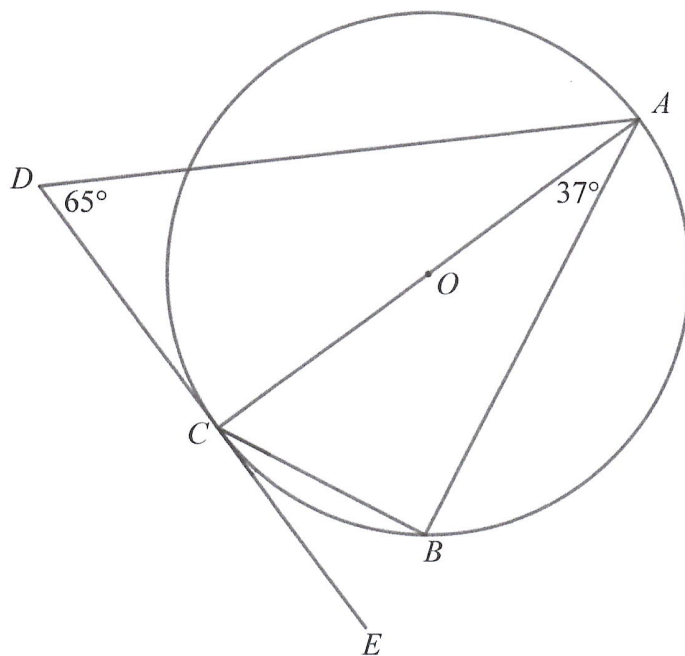
7. Samantha leaves home at 7:55 a.m. and drives 75 km to work at an average speed of 60 km/h. It takes 15 minutes for her to walk from the parking lot at work to her office. Determine her arrival time at the office. [4]
-

8. (a) Factorise $16ab^3c - 8ab + 32a^2bc^2$ [3]
- (b) Simplify:
- | | | |
|------|---------------------------------|-----|
| (i) | $1.1a + 3.3 - 5(3 - 0.2a)$ | [3] |
| (ii) | $\left(\frac{3x}{y^2}\right)^3$ | [3] |
-

9. A floor is covered with 16-inch square tiles. There are $17\frac{1}{2}$ tiles along the width and 19 tiles along the length.
- | | | |
|------|--|-----|
| (a) | Using 1 inch = 2.54 centimetres, find in centimetres the | |
| (i) | width of the floor, | [2] |
| (ii) | length of the floor. | [2] |
| (b) | Find the area of the floor in square metres. | [2] |
-



10. Circle ABC has a centre at O .
 DE is tangent to the circle at C .
 Angle $BAC = 37^\circ$ and angle $ADC = 65^\circ$.

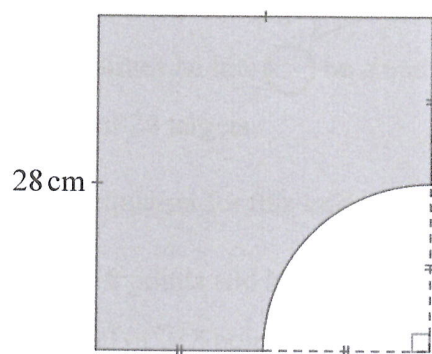


NOT TO SCALE

Find angle

- | | | |
|-----|---------|-----|
| (a) | ABC , | [1] |
| (b) | BCE , | [1] |
| (c) | DAC . | [1] |

11.



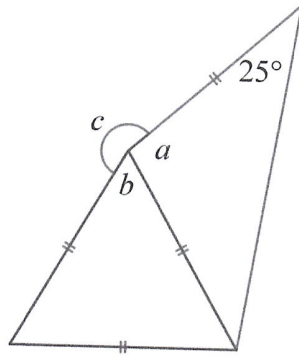
NOT TO SCALE

Using $\pi = \frac{22}{7}$, find the perimeter of the shaded region above.

[4]

[Turn over

12. (a)



NOT TO SCALE

Find the size of the following angles.

(i) a

[1]

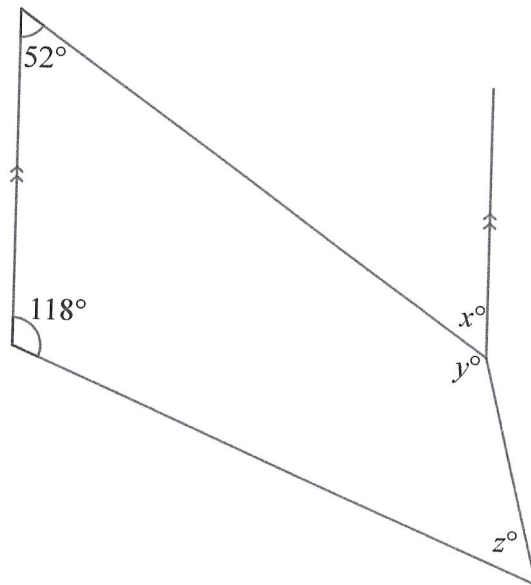
(ii) b

[1]

(iii) c

[1]

(b)



NOT TO SCALE

In the above diagram, $y = 2x$.

Find the size of the following angles.

(i) x

[1]

(ii) y

[1]

(iii) z

[1]



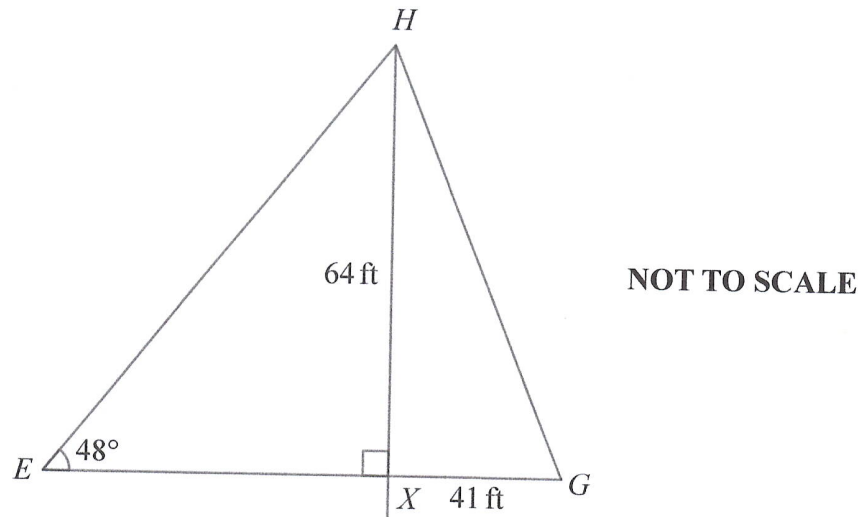
13. The diagram shows the design plans of a sail.

EG is a straight line.

$HX = 64$ ft.

$XG = 41$ ft.

$\angle HEX = 48^\circ$



Calculate, correct to the nearest whole number,

- (a) length HG , [3]
- (b) $\angle XGH$, [3]
- (c) length EG . [4]

14. In a dart game, Jordan can hit targets that are either  or .
- Let the number of times he hits  be a and the number of times he hits  be b .
- Jordan hits a total of 24 targets.

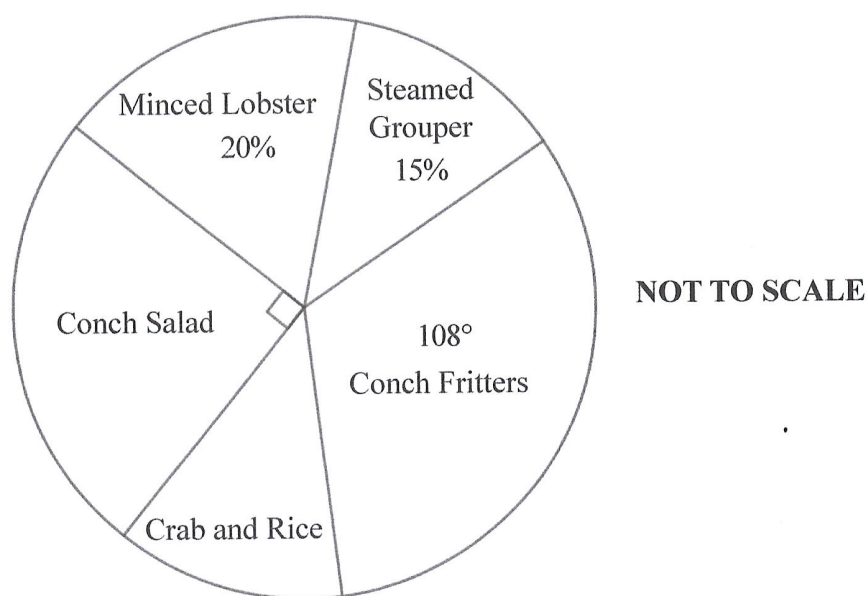
- (a) Write an equation for this information in terms of a and b . [1]

Hitting  scores 8 points and hitting  scores 10 points.

Jordan scores a total of 218 points.

- (b) Write an equation for the total score in terms of a and b . [2]
- (c) Solve the simultaneous equations to find how many times each target was hit. [4]

15. In a survey a group of 1,440 tourists were asked to name their favourite Bahamian dish. Their responses are shown in the pie chart below.



Find the

- (a) angle representing Minced Lobster, [2]
- (b) percentage of tourists that chose Conch Fritters, [2]
- (c) number of tourists that picked Crab and Rice. [3]

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

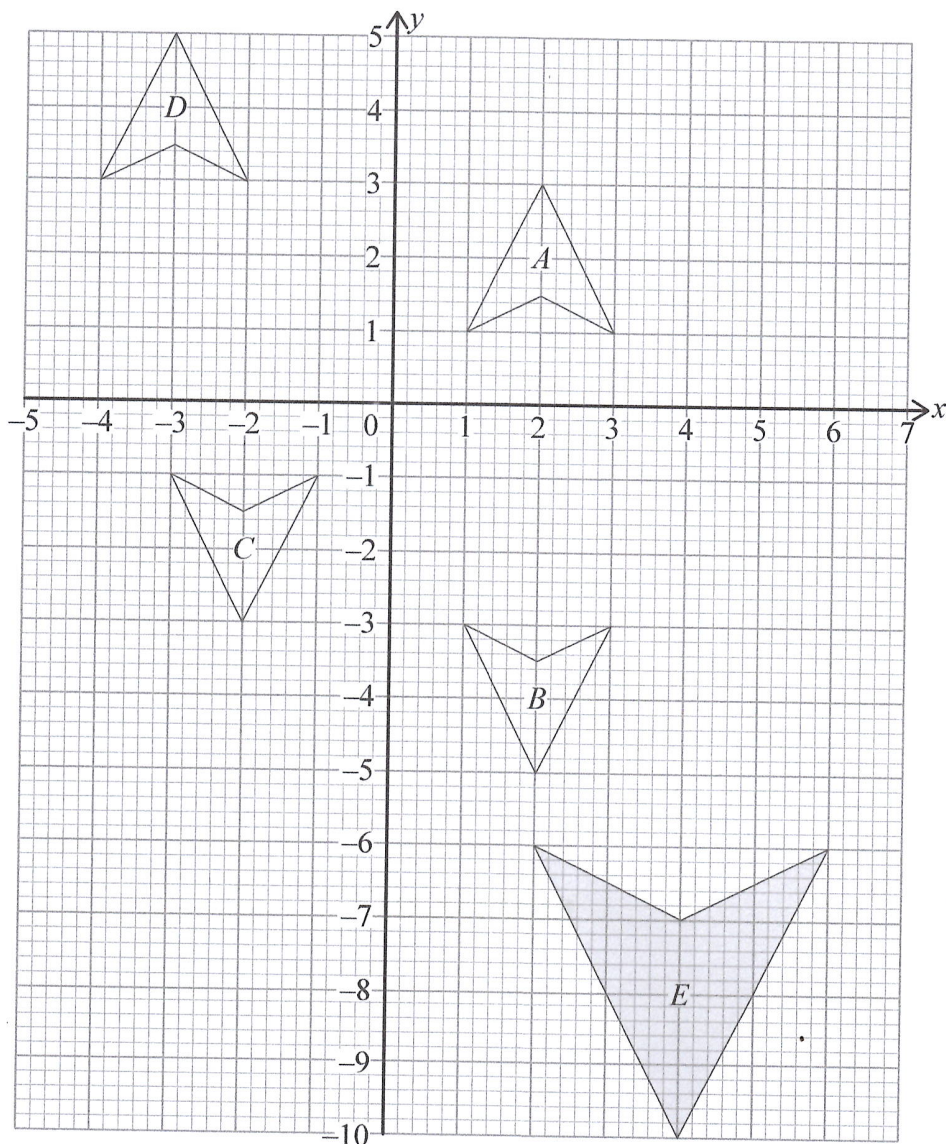
Height	1	1.5	3	5	6	9	12	15
Cross-sectional Area	180	120	60	36	30	20	15	12

The table shows the relationship between the height of a box and its cross-sectional area.

- (a) Using a horizontal scale of 1 cm to 1 unit for the height and a vertical scale of 1 cm to 10 units for the cross-sectional area, plot the data points from the table and join them with a smooth curve. [4]
- (b) Use your graph to estimate
 - (i) the cross-sectional area when the height is 4 units, [1]
 - (ii) the height when the cross-sectional area is 90 square units. [1]



17.



Describe fully the single transformation that maps

- (a) Shape *A* onto Shape *B*, [2]
- (b) Shape *A* onto Shape *C*, [3]
- (c) Shape *A* onto Shape *D*, [3]
- (d) Shape *B* onto Shape *E*. [3]

18. Jamie purchases a laptop which costs \$1,200.

Jamie gets a loan for the full price of the laptop at a simple interest rate of 3% per year.

She pays back the loan in equal monthly payments over 18 months.

Calculate her monthly payments, correct to the nearest cent.

[6]

End]

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MATHEMATICS

PAPER 3 (CORE/EXTENDED) 3815/3

Tuesday **15 JUNE 2021** 9:00 A.M.–11:30 A.M.

Additional materials:

Answer booklet

Graph paper

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 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 [].

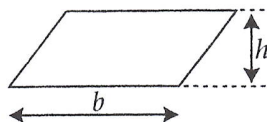
The total number of marks for this paper is 100.

This question paper consists of 10 printed pages and 2 blank pages.

INFORMATION AND FORMULAE

MENSURATION

Parallelogram



$$\text{Area} = bh$$

Circle (radius r , diameter d)

Cylinder (radius r , height h)

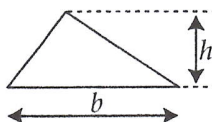
Sphere (radius r)

Prism

Pyramid

Cone (radius r , height h)

Triangle



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

Circumference

Area

Volume

Area of curved surface

Volume

Area of surface

Volume

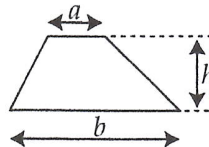
Volume

Volume

Volume

Area of curved surface

Trapezium



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

$$= 2\pi r \text{ or } \pi d$$

$$= \pi r^2$$

$$= \pi r^2 h$$

$$= 2\pi r h$$

$$= \frac{4}{3}\pi r^3$$

$$= 4\pi r^2$$

$$= \text{area of cross-section} \times \text{length}$$

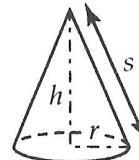
$$= \frac{1}{3} \times \text{area of base} \times \text{height}$$

$$= \frac{1}{3}\pi r^2 h$$

$$= \pi r s$$

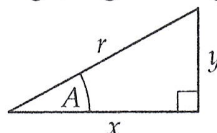
$$\text{where } s = \text{slant height } \sqrt{h^2 + r^2}$$

Cone

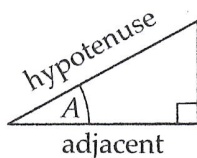


TRIGONOMETRY

Right-angled triangle



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

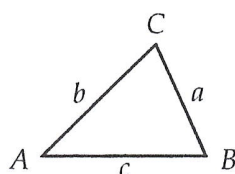


opposite

adjacent

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

Any triangle



$$\text{In any triangle } ABC: \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

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

NUMBER

ALGEBRA

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

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 $\frac{dy}{dx} = anx^{n-1}$



1. Find **TWO** possible values, correct to the nearest degree, of θ such that $0^\circ \leq \theta \leq 360^\circ$ and $\sin\theta = 1 - \cos 58^\circ$. [3]
-

2. In a public school, the ratio of girls to boys is 3:2. There are 950 students in the school.
- (a) 80% of the boys in the school take the bus to school. How many boys take the bus to school? [2]
- (b) If 58% of all students take the bus to school, how many girls take the bus to school? [2]
-

3. Calculate the compound interest on \$8400 at 4% per annum for three years. [3]
-

4. Find the value of x . [3]

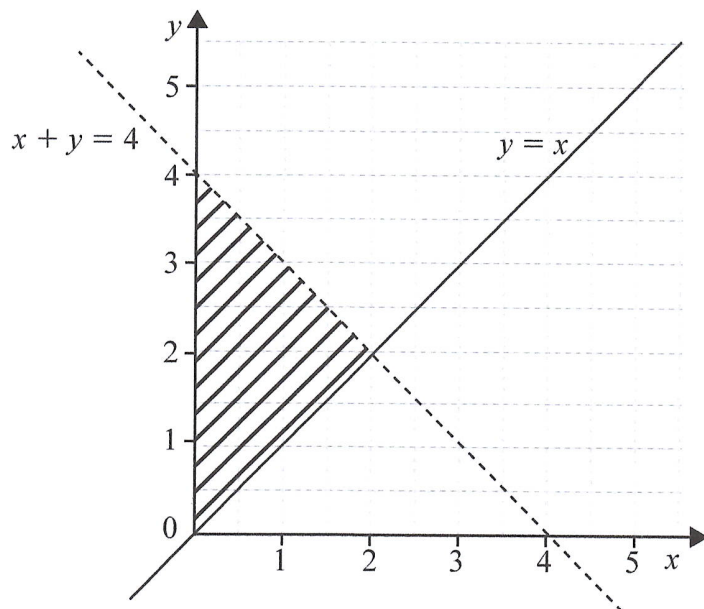
$$2^{3x+1} = 4^x$$

5. x is inversely proportion to y^2 . If $x = 4$ when $y = 3$, calculate the value of

- (a) x when $y = 12$ [3]

- (b) y when $x = 2\frac{1}{4}$ [3]
-

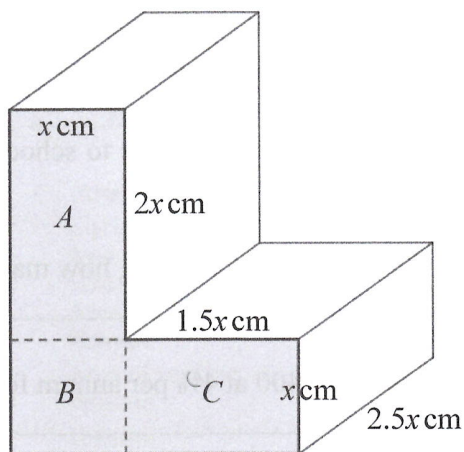
6. (a) Describe fully using inequalities the region that is shaded. [3]



- (b) Given that x is an integer, solve the inequality $10 \leq 2x < x + 9$ and state the values of x . [3]

[Turn over]

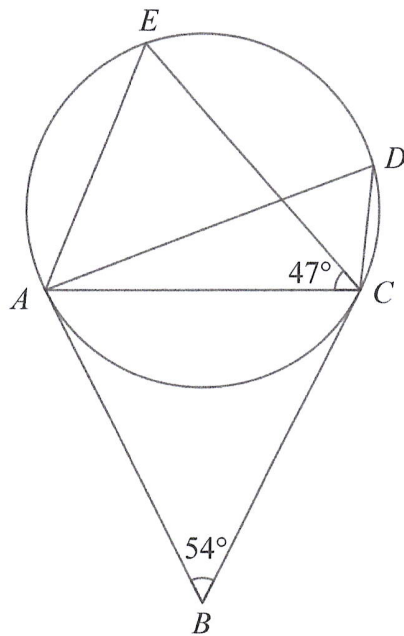
7. The diagram below is that of a compound prism with an L-shaped cross section with a length of $2.5x$ cm.



- (a) Write expressions in terms of x for the areas of the labelled parts of the cross section:
- (i) Region A [1]
 - (ii) Region B [1]
 - (iii) Region C [1]
- (b) Write a simplified expression in terms of x for the total area of the cross section. [1]
- (c) The volume of the prism is $2,430 \text{ cm}^3$, find the value of x . [3]
-



8. In the diagram below, AB and BC are tangents to the circle at points A and C respectively.



NOT TO SCALE

Determine the size of the following angles:

- | | | |
|-----|--------------|-----|
| (a) | $\angle BAC$ | [1] |
| (b) | $\angle AEC$ | [1] |
| (c) | $\angle EAC$ | [1] |
| (d) | $\angle ADC$ | [1] |

9.
$$\begin{pmatrix} 2x-3 & 4 \\ -18 & y \end{pmatrix} \begin{pmatrix} 2 \\ 6 \end{pmatrix} = \begin{pmatrix} 15 \\ 0 \end{pmatrix}$$

- | | | |
|------|---|-----|
| (a) | Calculate the value of | |
| (i) | x , | [3] |
| (ii) | y . | [2] |
| (b) | Given that the matrix $\begin{pmatrix} z & -3 \\ 8 & 6 \end{pmatrix}$ has no inverse, find the value of z . | [2] |



10. (a) Simplify

$$\frac{xy - 3x + 4y - 12}{5x + 20}$$

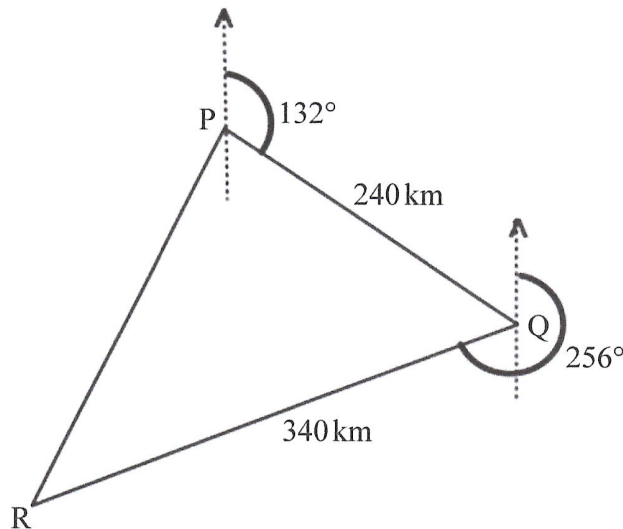
[4]

Using your answer from (a), simplify

(b) $\frac{xy - 3x + 4y - 12}{5x + 20} \div \frac{y^2 - 9}{xy + 6x}$

[4]

11. The diagram shows the route of a mail boat sailing from Port P to Port Q and then to Port R. The bearing of Port Q from Port P is 132° and the bearing of Port R from Port Q is 256° .



NOT TO SCALE

- (a) Calculate the size of angle PQR.

[2]

The distance from Port P to Port Q is 240 km.
The distance from Port Q to Port R is 340 km.

- (b) Calculate the distance RP, giving your answer correct to the nearest whole number. [4]

- (c) Calculate the bearing of Port R from Port P. [4]



12. The functions f and g are defined as follows:

$$f(x) = 3x + 2 \quad g(x) = \left(\frac{2x - 1}{3} \right)$$

- (a) Calculate the value of $f(-4)$. [1]
- (b) Determine, in simplified form, expressions for
- (i) $g^{-1}(x)$, [3]
- (ii) $gf(x)$. [4]
- (c) Calculate the value of x for which $f(x) = g(x)$. [4]
-



13. The cumulative frequency table below shows the results of a placement test given to 200 students upon their entry into a college.

The maximum score for the test is 100 marks. The scores are organised in groups of 10-mark increments.

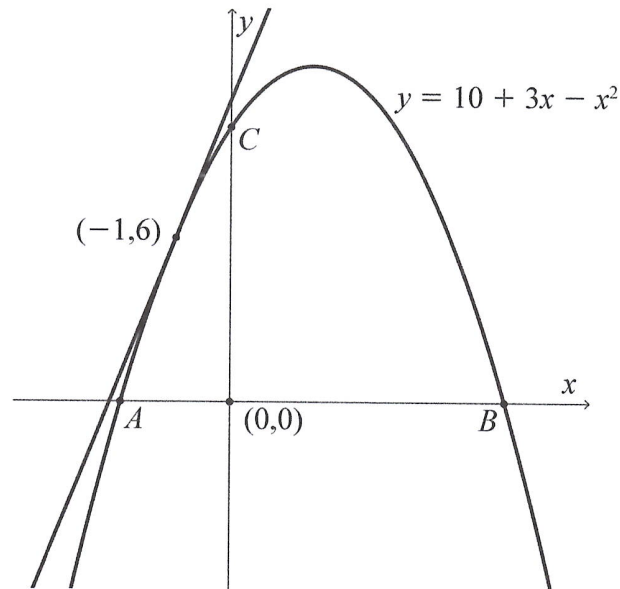
Marks Earned	Frequency	Cumulative Frequency
1–10	4	4
11–20	4	8
21–30	11	19
31–40	21	40
41–50	37	
51–60	44	
61–70	38	
71–80	24	
81–90	12	
91–100	5	

- (a) Copy and complete the cumulative frequency table. [2]
- (b) Using a scale of 1 cm to 10 marks on the x -axis and 1 cm to 10 students on the y -axis, draw a cumulative frequency curve of the completed table of data. [4]
- (c) Use the cumulative frequency curve to estimate the:
- (i) median mark, [1]
 - (ii) upper quartile mark, [1]
 - (iii) interquartile range. [2]



14. The diagram below shows the graph of the equation $y = 10 + 3x - x^2$. The scales of the x and y axes are different.

The graph of $y = 10 + 3x - x^2$ passes through the y -axis at point C and passes through the x -axis at points A and B .



- (a) Determine the y -coordinate of point C . [1]
- (b) Determine the x -coordinates of points A and B . [4]

There is also a tangent line to the curve $y = 10 + 3x - x^2$ at the point $(-1, 6)$.

- (c) Determine the gradient of this tangent line. [2]



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

$\overrightarrow{OP}$ and $\overrightarrow{OQ}$ are position vectors such that O is the origin and

$$\overrightarrow{OP} = \begin{pmatrix} 10 \\ 5 \end{pmatrix} \text{ and } \overrightarrow{OQ} = \begin{pmatrix} 2 \\ 11 \end{pmatrix}$$

- (a) Using a scale of 1 cm to 1 unit on both axes and values $0 \leq x \leq 14$ and $0 \leq y \leq 16$, draw and label the vectors $\overrightarrow{OP}$ and $\overrightarrow{OQ}$ [3]
- (b) (i) Draw the vector $\overrightarrow{PQ}$ [1]
(ii) Give $\overrightarrow{PQ}$ in column vector form. [2]
- (c) Calculate the magnitude of $\overrightarrow{PQ}$ [2]
- (d) (i) X is the midpoint of $\overrightarrow{PQ}$. Mark the position of X on your graph. [1]
(ii) Express $\overrightarrow{OX}$ as a column vector. [1]
-



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