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MATHEMATICS

PAPER 2 (CORE/EXTENDED) 3815/2

Wednesday **22 MAY 2024** 9:00 A.M.–11:00 A.M.

Additional materials:
Calculator (not graphing)
Geometrical instruments
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.

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.**

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.

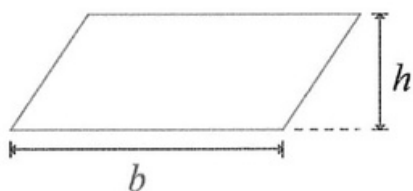


This question paper consists of 8 printed pages.

INFORMATION AND FORMULAE

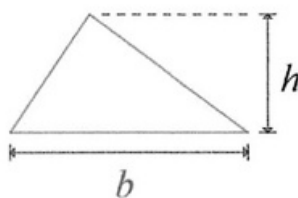
MENSURATION

Parallelogram



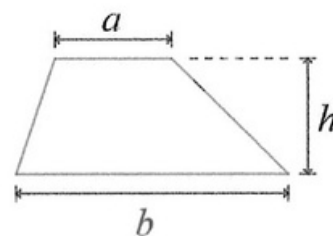
$$\text{Area} = bh$$

Triangle



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

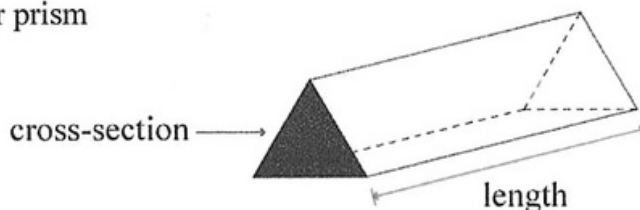
Trapezium



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

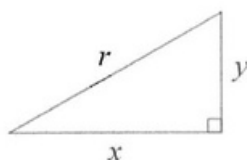
Circle (radius r , diameter d)	Circumference	$2\pi r$ or πd
	Area	πr^2
Cylinder (radius r , height h)	Volume	$\pi r^2 h$
Prism	Volume	area of cross-section $\times$ length

e.g. triangular prism

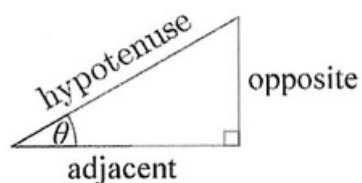


TRIGONOMETRY

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.

1. From the set $\{60, 61, 62, 63, 64, 65\}$, write a
- (a) factor of 183, [1]
 - (b) multiple of 7, [1]
 - (c) cube number. [1]

2. Evaluate $2^5 + \sqrt[3]{-27}$ [2]

3. Shay is paid \$2,520 per month.

She pays the following bills:

- ☐ \$650.00 rent monthly
 - ☐ \$210.00 utilities monthly
 - ☐ \$140.00 groceries weekly

- (a) For a month with four weeks, determine how much money is left after all these bills are paid. [3]

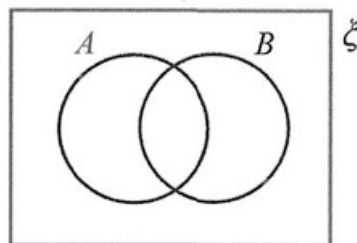
She sets aside 15% of her remaining pay for entertainment.

- (b) Calculate her entertainment budget per month. [1]

4. Let $\xi = \{x \text{ is a natural number: } x \leq 10\}$

$A = \{\text{even numbers}\}$

$B = \{\text{factors of 12}\}$



- (a) Copy and complete the Venn diagram illustrating the sets above. [4]
- (b) List the elements of the following sets.
 - (i) $A \cap B$ [1]
 - (ii) A' [1]
- (c) Find $n(A \cup B)$. [1]

5. A cruise ship leaves port A and travels 195.5 miles to port B in $5\frac{3}{4}$ hours.

(a) Calculate the average speed of the cruise ship. [2]

After leaving port B, the ship travels at a speed of 30 mph to port C.

It takes $2\frac{1}{2}$ hours for this part of the journey.

(b) Find the distance between port B and port C. [2]

(c) Calculate the average speed of the entire journey from port A to port C. [3]

6. Given the vectors $\mathbf{p} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}$ and $\mathbf{q} = \begin{pmatrix} 4 \\ -5 \end{pmatrix}$, write the column vector form of

(a) $\mathbf{p} + \mathbf{q}$, [2]

(b) $2\mathbf{p} - \mathbf{q}$. [3]

7. Rewrite the following statements using inequality symbols.

(a) y is at most 16. [1]

(b) z is greater than 0 but less than 9. [2]

8. Solve $\frac{2}{5} + x = \frac{3x}{10} + \frac{3}{4}$ [3]

9. $C = \frac{5F - 160}{9}$ is used to convert degrees of temperature from Fahrenheit (F) to Celsius (C).

(a) Convert:

(i) $50^\circ F$ to $^\circ C$, [2]

(ii) $50^\circ C$ to $^\circ F$ [4]

(b) Make F the subject of the formula. [3]

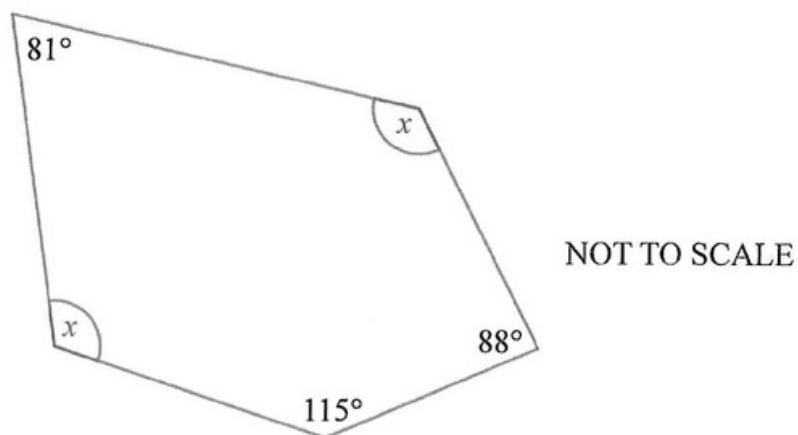


10. Factorise:

$$24x^3y^2 - 18x^2y^2 + 30xy^2$$

[3]

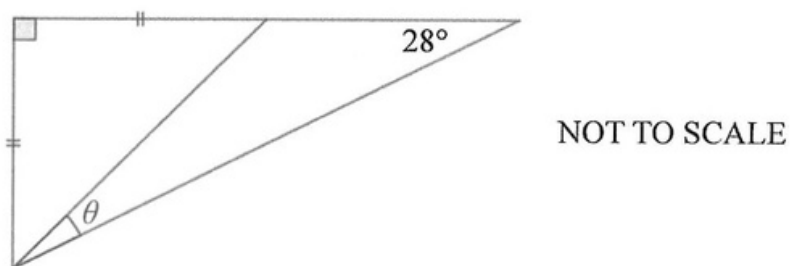
11. (a)



Given the irregular pentagon above, find the size of angle x .

[4]

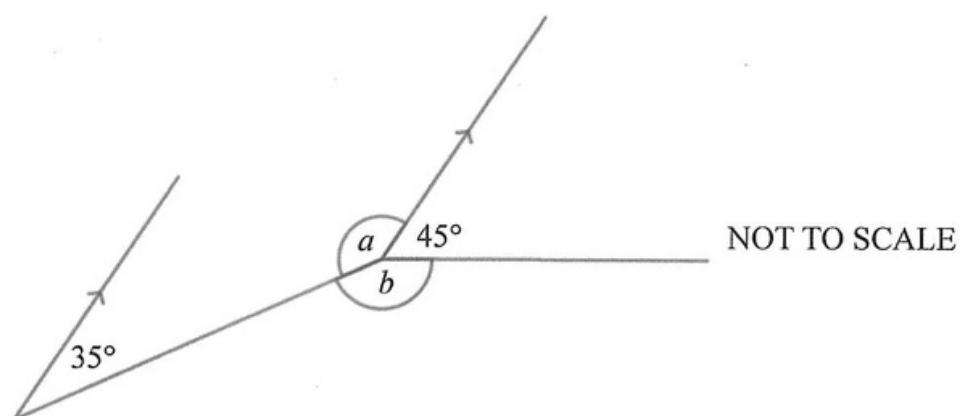
(b)



Find the size of angle θ in the above diagram.

[2]

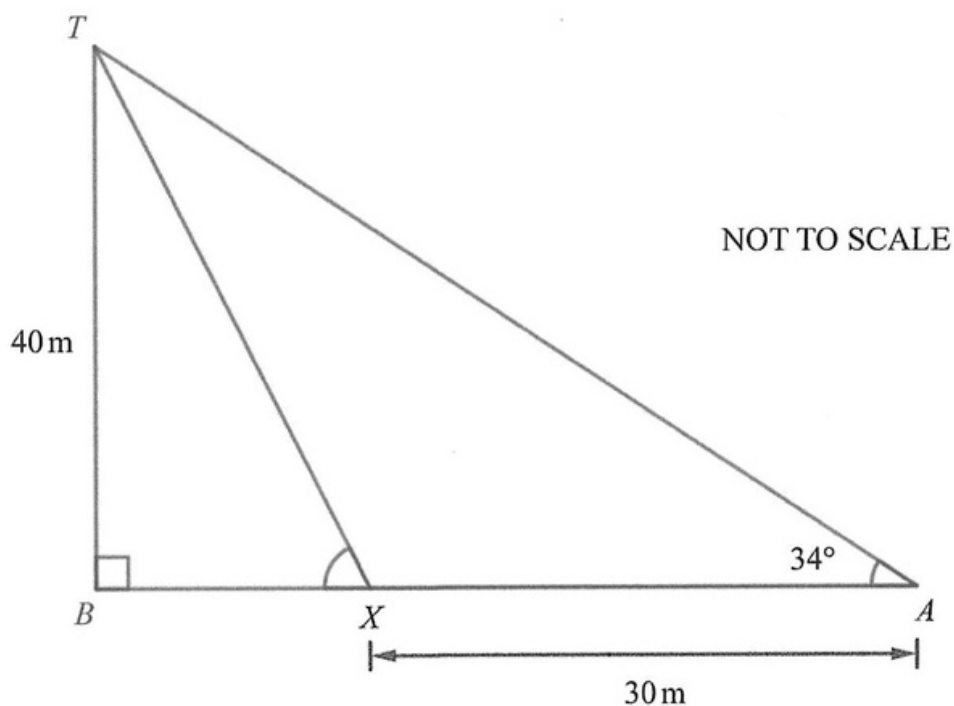
(c)



Find the sizes of angles a and b in the above diagram.

[2]

12.



A 40 m tower stands at point B and a surveying team is standing at point A .

They measure the angle to the top (T) of the tower as 34° , as shown in the diagram.

In this question, give your answers to the nearest whole number.

- (a) Find the distance BA . [3]

The survey team then moves forward 30 m to point X .

- (b) Calculate length BX . [1]

- (c) Calculate length TX . [3]

- (d) Find the size of $\hat{BXT}$. [3]



13. In an examination Taylor got x marks.

Adam got 9 marks more than Taylor.

Geneva got twice as many marks as Adam.

- (a) Simplifying where possible, write an expression for the number of marks obtained by
- (i) Adam, [1]
- (ii) Geneva. [2]

All three students obtained a combined total of 187 marks.

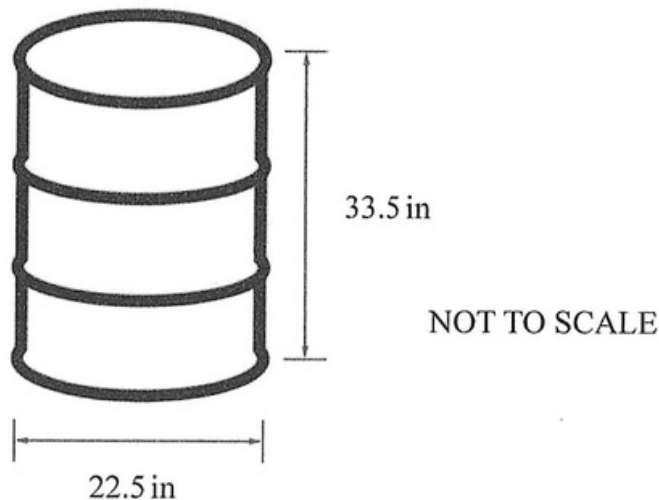
- (b) Form and solve an equation to show how many marks Taylor obtained. [4]

-
14. Solve the pair of simultaneous equations.

$$x - 3y = 15$$

$$4x + y = 8$$
 [5]

-
15. Cleen n Fresh Cleaning Company makes its dish liquids in cylindrical drums that have a diameter of 22.5 inches and a height of 33.5 inches.



- (a) Using $\pi \approx 3.14$, calculate the volume of dish liquid in a drum when full.
Give your answer correct to the nearest 100 in^3 . [4]
- (b) Determine how many one litre bottles can be completely filled from one drum ($1 \text{ litre} \approx 61 \text{ in}^3$). [2]

16. Simplify

(a) $\frac{3x}{5} - \frac{x}{3}$ [3]

(b) $\left(\frac{4x}{y^2}\right)^3$ [3]

(c) $\frac{7x^3}{12} \div \frac{21x^2}{8}$ [3]

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

(a) Copy and complete the table for the equation $y = (x - 3)^2 - 4$

x	-1	0	1	2	3	4	5	6	7
y		5	0	-3	-4		0	5	12

[2]

(b) Using a scale of 1 cm to 1 unit on each axis, for $-3 \leq x \leq 8$ and $-5 \leq y \leq 13$, draw the graph of the curve $y = (x - 3)^2 - 4$. [3]

(c) On the same coordinate grid, draw the graph of the line $y = -2x + 5$ [2]

(d) State the x-coordinates of the points where the graphs intersect. [2]



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