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MATHEMATICS

PAPER 2 (CORE/EXTENDED) 3815/2

Thursday **10 JUNE 2021** 9:00 A.M.–11:00 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 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 [].

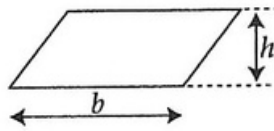
The total number of marks for this paper is 100.

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

INFORMATION AND FORMULAE

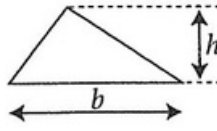
MENSURATION

Parallelogram



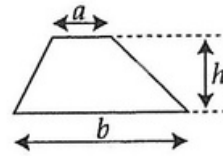
$$\text{Area} = bh$$

Triangle



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

Trapezium



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

Circle (radius r , diameter d)

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

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

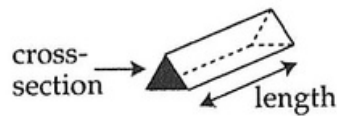
Cylinder (radius r , height h)

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

Prism

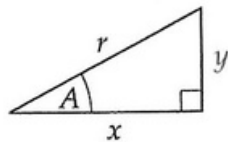
$$\text{Volume} = \text{area of cross-section} \times \text{length}$$

e.g. triangular prism

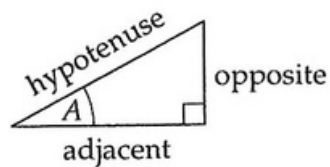


TRIGONOMETRY

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.  The temperature in Canada at 5:00 pm is -6°C .
It falls overnight by 10°C and warms by 20°C at 11:00 am.
Find the temperature at 11:00 am. [2]
-
2. Eric buys three cracked conch snacks at \$14.50 each and two conch salads at \$12 each.
(a) Calculate the total cost. [3]
VAT at 12% is added to the total.
(b) Calculate the amount due for VAT. [2]
(c) Calculate Eric's total bill. [1]
Eric pays with two \$50 notes.
(d) How much change did he receive? [1]
-
3. (a) Write the following in standard form (scientific notation).
(i) 7,564,000,000,000 [1]
(ii) 0.0000918 [1]
(b) Jupiter has a volume of approximately $1.43 \times 10^{15} \text{ km}^3$.
The volume of Neptune is approximately $6.25 \times 10^{13} \text{ km}^3$.
How many times bigger is Jupiter than Neptune? Give your answer in standard form. [2]
-
4. (a) Solve the inequality below. [3]
 $8m - 7 \geq 5m + 14$
(b) Show your solution to (a) on a number line. [2]
-

5. A man's basic wage for a 40-hour week is \$38.40 per hour.

(a) Calculate his weekly wage.

[1]

Overtime is paid at time and a half.

(b) (i) Calculate his pay for one hour of overtime.

[1]

(ii) Calculate his total wage for a week when he works 58 hours.

[3]

6. Sammy makes a zip line run in 45 seconds at an average speed of 17.6 m/s. Calculate the length of the zip line.

[2]

7. At a time when the exchange rate of US currency to Guyanese currency is US\$1 = GUY\$208.65

(a) Cherelle converts US\$500 to GUY\$. How much does she receive in GUY\$?

[1]

(b) Cherelle spends GUY\$77,617.80 and converts the remaining amount to US\$. How much does she receive in US\$?

[3]

8. (a) If $x = 3$, $y = -5$ and $z = 9$, find the value of

$$\frac{6x^2 - 9y}{z}$$

[3]

(b) Simplify

$$\frac{5a}{6} + \frac{a}{9}$$

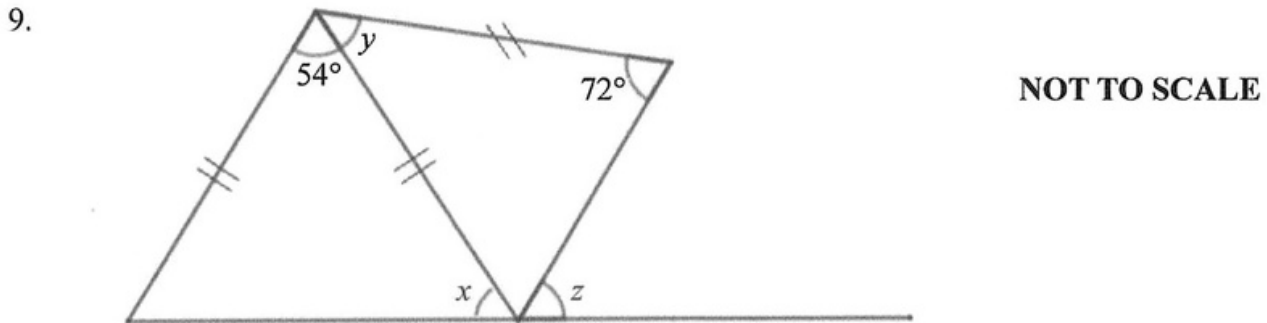
[2]

(c) Solve the following pair of simultaneous equations.
Show all working to support your answer.

[5]

$$\begin{aligned} 2x + y &= 18 \\ 3y - 4x &= -1 \end{aligned}$$





Using the diagram, calculate the size of angle

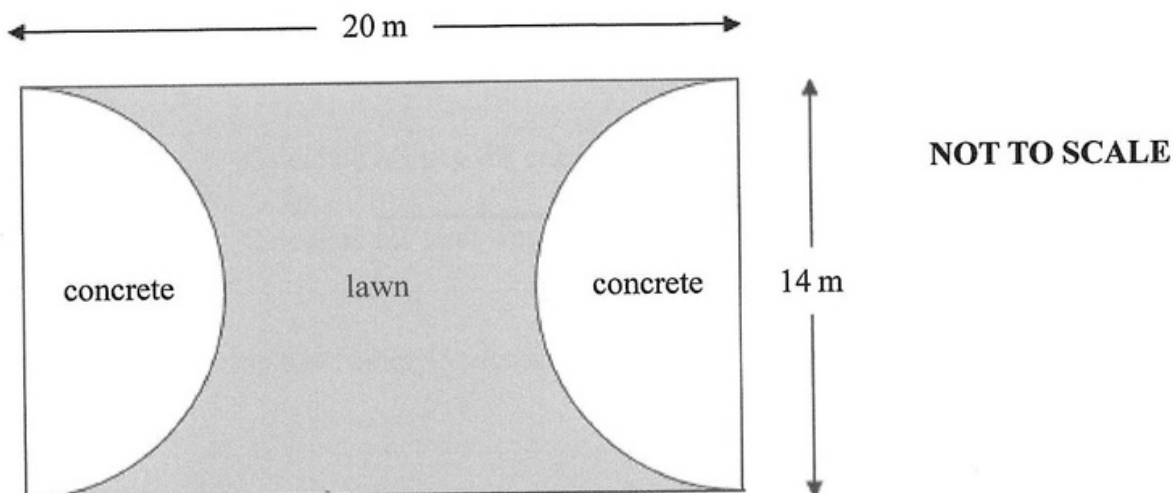
- (a) x [1]
- (b) y [1]
- (c) z [1]

10. A group of 24 tourists were asked which of the Family Islands they enjoyed most. The results are shown in the table below.

Island	Number of Tourists	Angle in Pie Chart
Exuma	10	150°
Eleuthera	6	90°
Abaco	5	
Andros		

- (a) Copy and complete the table. [4]
- (b) (i) Using a ruler and compass, construct a circle with a 4 cm radius. [1]
- (ii) Draw an accurate pie chart to represent the information in the completed table. [4]

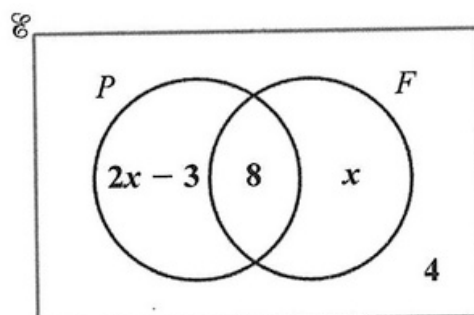
11. The rectangular playground design, shown below, consists of a lawn and two equal semi-circles of concrete.



Use $\pi = \frac{22}{7}$ where necessary in this question.

- (a) (i) Calculate the perimeter of the lawn. [2]
- (ii) Fencing is sold at \$40.75 per metre. Calculate the cost of fencing the lawn. [2]
- (b) Calculate the area of the lawn. [3]
-
12. A class of 30 students were asked if they studied Physics or French. The Venn diagram below shows their responses.

$\mathcal{E} = \{\text{students in the class}\}$
 $F = \{\text{students who study French}\}$
 $P = \{\text{students who study Physics}\}$

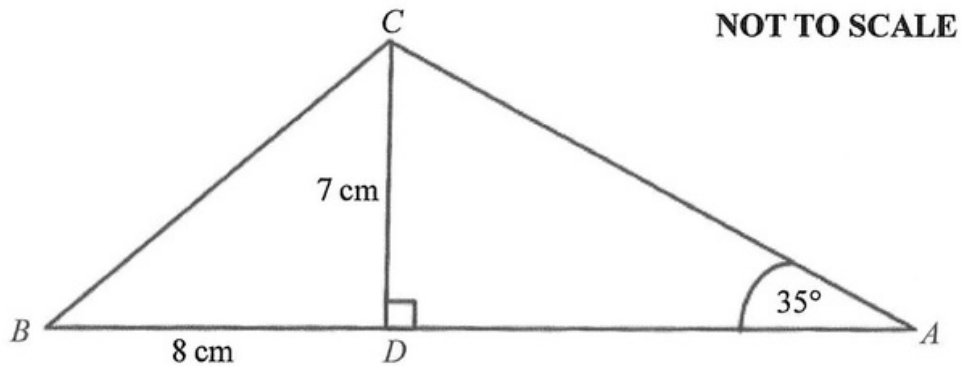


- (a) How many students study neither Physics nor French? [1]
- (b) Calculate the value of x . [3]
- (c) Use your value of x to calculate the number of students who study Physics only. [1]



13. The diagram below shows triangle ABC with $\angle CAB = 35^\circ$.

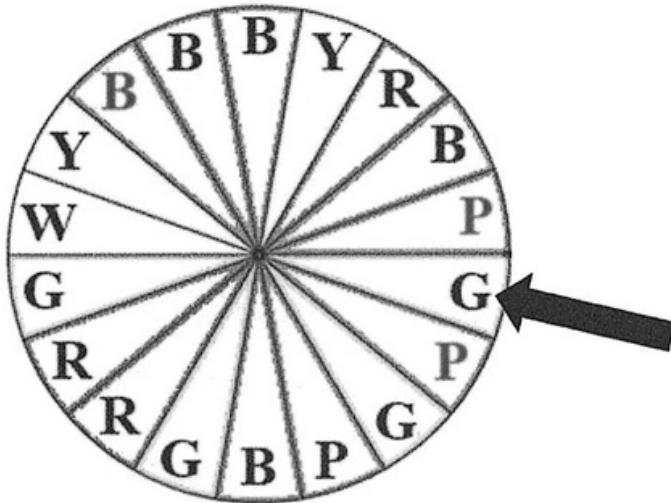
The point D lies on AB such that CD is the perpendicular height, $CD = 7$ cm and $BD = 8$ cm.



Rounding your answer to 2 decimal places, calculate the

- | | | |
|-----|---------------------------|-----|
| (a) | length of the side BC , | [2] |
| (b) | size of $\angle CBD$, | [3] |
| (c) | length of the side AB . | [4] |
-

14.



Code	Colour
Y	Yellow
G	Green
B	Blue
R	Red
W	White
P	Purple

Operators of a game show are setting up a colour spin wheel for prizes.

There are 18 segments on the wheel and each segment has an equal chance of stopping on the arrow.

- (a) Determine:
- (i) the probability of getting G. [1]
 - (ii) the probability of getting B or R. [1]
- (b) Which colours have a $\frac{1}{6}$ chance of occurring? [2]

The game managers need to paint the white segment.

- (c) Which colour must the white segment be painted for three colours to have an equal chance of occurring? [1]
- (d) If the wheel was spun 36 times, how many times would you expect blue to occur? [2]



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

- (a) Copy and complete the table of values for $y = \frac{9}{x+1}$ [2]

x	0	0.5	1	2	3	4	5	6	7	8
y	9	6	4.5		2.3	1.8		1.3	1.1	1

- (b) Using a scale of 2 cm to 1 unit on both axes and taking x -values from $0 \leq x \leq 8$ and y -values $0 \leq y \leq 9$, draw and label the graph of $y = \frac{9}{x+1}$ [3]
- (c) On the same graph, draw and label the graph $y = 7 - 2x$ [2]
- (d) Write down the coordinates of the points of intersection. [2]
-



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