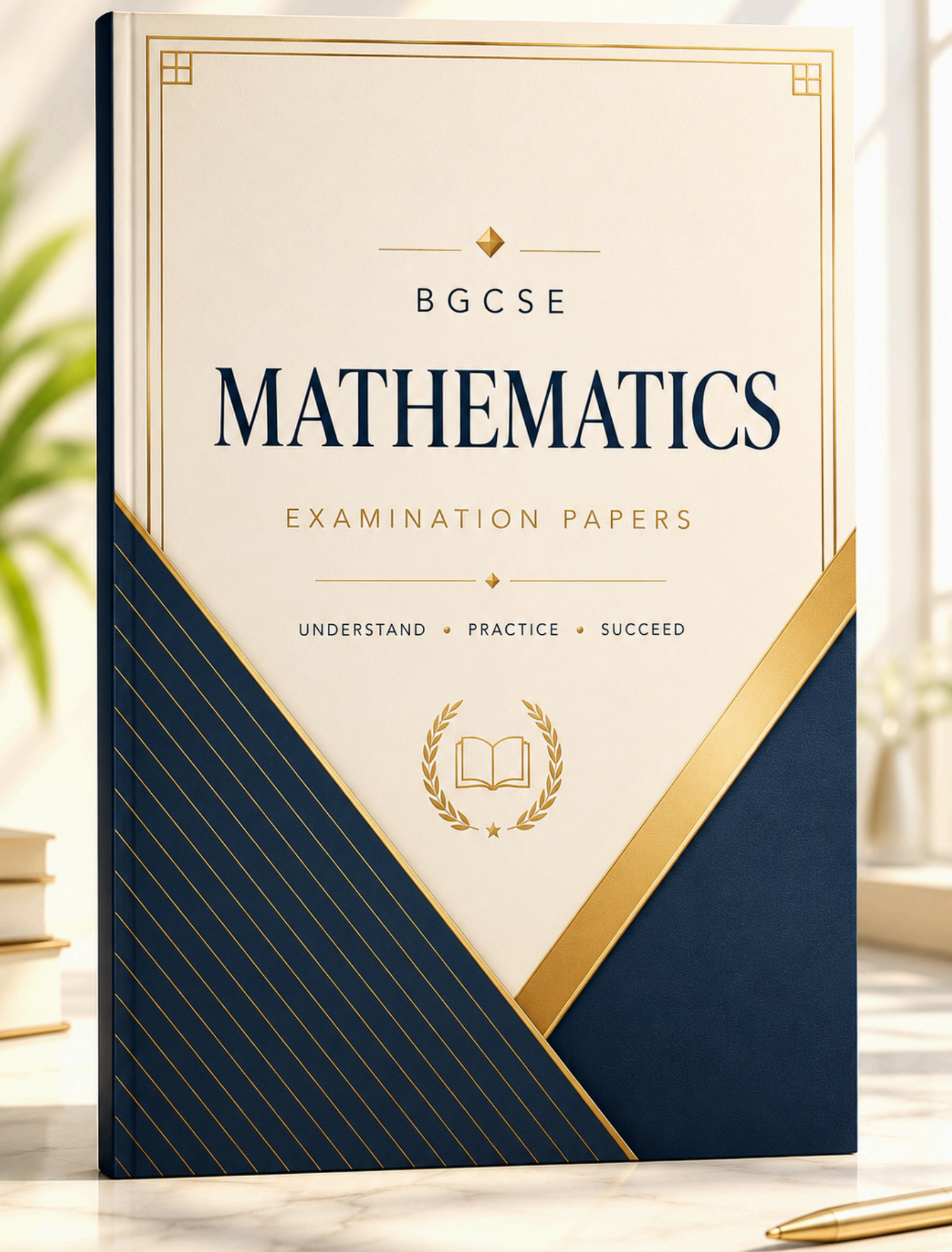
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MATHEMATICS

PAPER 2 (CORE/EXTENDED) 3815/2

Tuesday 19 MAY 2020 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 [ ].

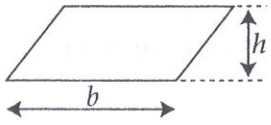
The total number of marks for this paper is 100.

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

INFORMATION AND FORMULAE

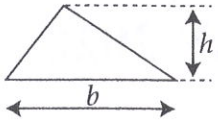
MENSURATION

Parallelogram



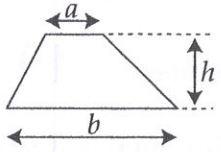
Area = bh

Triangle



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

Trapezium



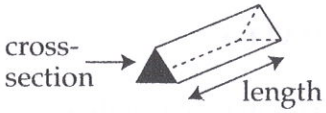
Area = $\frac{1}{2}(a+b)h$

Circle (radius r, diameter d) Circumference = $2\pi r$ or πd
Area = πr^2

Cylinder (radius r, height h) Volume = $\pi r^2 h$

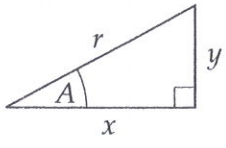
Prism Volume = area of cross-section × length

e.g. triangular prism

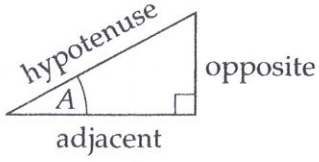


TRIGONOMETRY

Right-angled triangle



$r^2 = x^2 + y^2$, (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 $1 \leqslant a < 10$ and n is an integer.

1. One megabyte (MB) of computer memory contains 1,048,576 bytes.

   Convert this number into scientific notation (standard form) correct to 4 significant figures. [2]

---

2. Express this ratio in simplest form.

   600 mg : 6 g [2]

---

3. Copy the statements below.

   Then write the symbol $<$, $>$ or $=$ in each space to make each statement correct.

   (a) 3^2 _____ 2^3 [1]

   (b) 3^0 _____ 2^0 [1]

   (c) 3^{-1} _____ 2^{-1} [1]

---

4. Solve $\frac{x}{4} + \frac{13}{20} = \frac{x}{5}$ [4]

---

5. Jan has a collection of marbles. One-third of the marbles are pink, three-eighths are yellow, one-quarter are blue and the remaining two marbles are white.

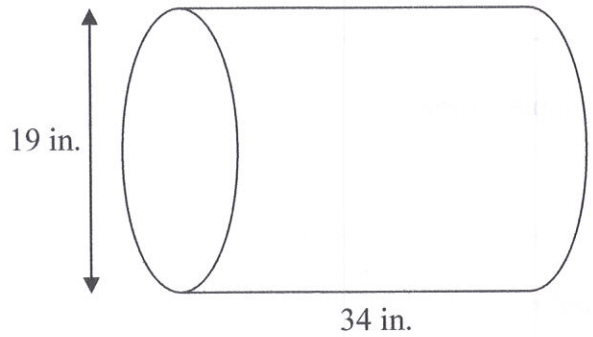
   Calculate

   (a) the fraction of marbles that are white, [3]

   (b) the total number of marbles. [2]

---

6. The gasoline tank of a van is cylindrical in shape. It has a diameter of 19 inches and is 34 inches long.



(a) Using $\pi = 3.14$, calculate the volume of the tank. [3]

The tank is filled with gasoline at a cost of \$5.28 per gallon.
[1 gallon US = 231 cubic inches]

(b) Calculate, to the nearest cent, the cost of a full tank of gasoline. [2]

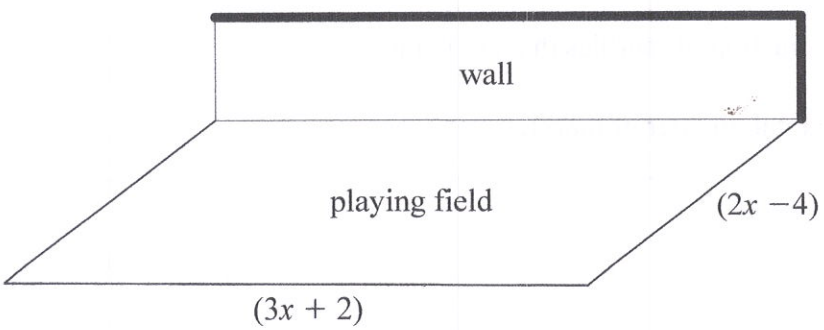
---

7. Solve the following pair of simultaneous equations.

$$y = 4x + 1$$
$$2x + y = 4$$ [5]

---

8. A rectangular playing field of length $(3x + 2)$ metres and width $(2x - 4)$ metres is bounded on one side by a wall. The other sides are to be fenced.



(a) Write down and simplify an expression for the length of fencing needed. [2]

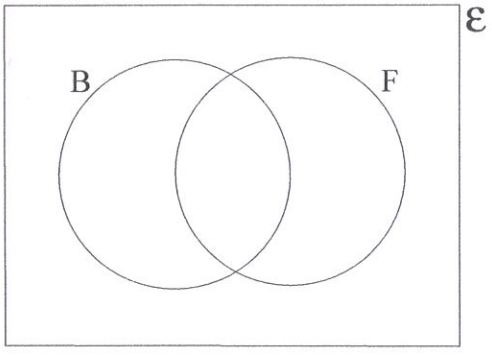
(b) Given that 169 metres of fencing is needed, calculate the value of x. [2]

(c) Hence, calculate the length and width of the field. [2]

---

9. In a survey of 80 athletes, 45 said that they play basketball (B), 40 play football (F) and 27 play neither game.

(a) Copy and complete the Venn diagram below using the above information.



[4]

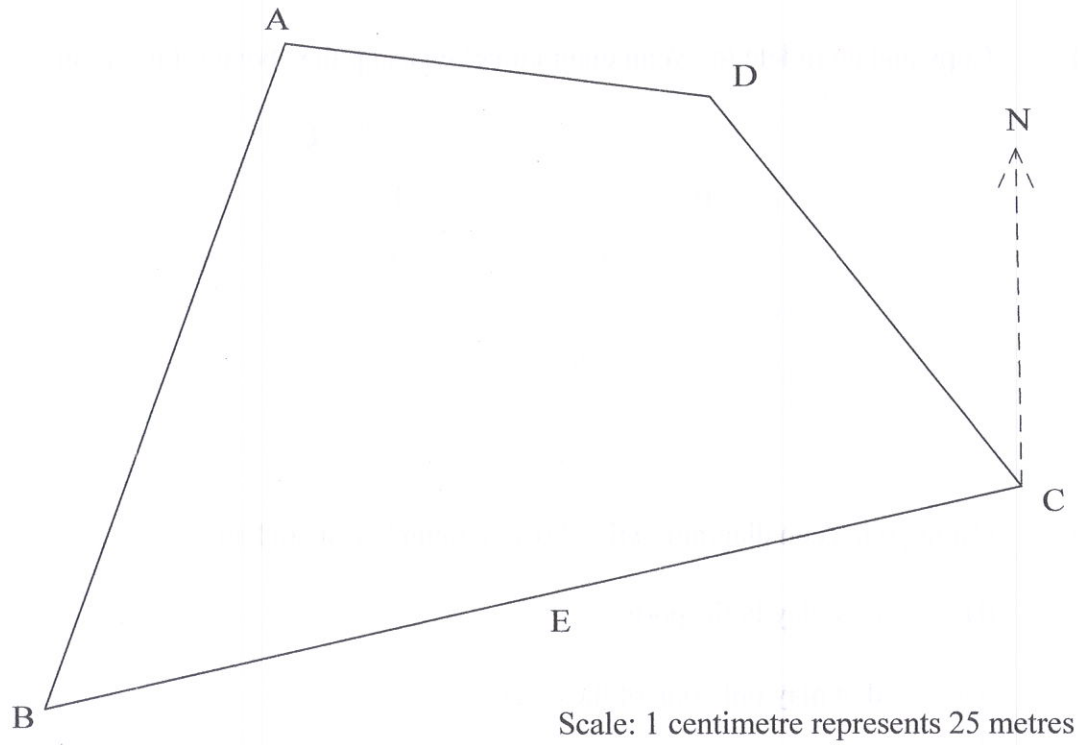
(b) Using your Venn diagram, write down the number of students

(i) that play both sports, [1]

(ii) that play only one of these sports, [1]

(iii) that do not play basketball. [1]

10. The diagram represents a surveyor's **scale drawing** of a piece of property.



Scale: 1 centimetre represents 25 metres

(a) Calculate the shortest distance (in metres) from B to D. [2]

(b) Write down the bearing of D from C. [1]

(c) Calculate the bearing of C from D. [1]

A roadway of length 80 m is to be constructed on the property.

(d) Calculate the length that this roadway will be on the scale drawing. [2]

11. Econo Car Rentals charges the customers for distances travelled as follows:

Fixed charge for distance of 70 km or less	Additional charge for distance over 70 km
\$62	\$1.60 per km

(a) Determine the cost of renting a car for a distance of

(i) 58 km [1]

(ii) 136 km [3]

After returning a car rental, a customer was charged a total of \$118.

(b) Calculate the distance travelled in the car. [3]

---

12. For the formula $s = \sqrt{\frac{w - 10e}{m}}$

(a) determine the value of s when $w = 450$, $e = 13$ and $m = 5$, [3]

(b) make e the subject of the formula. [4]

---

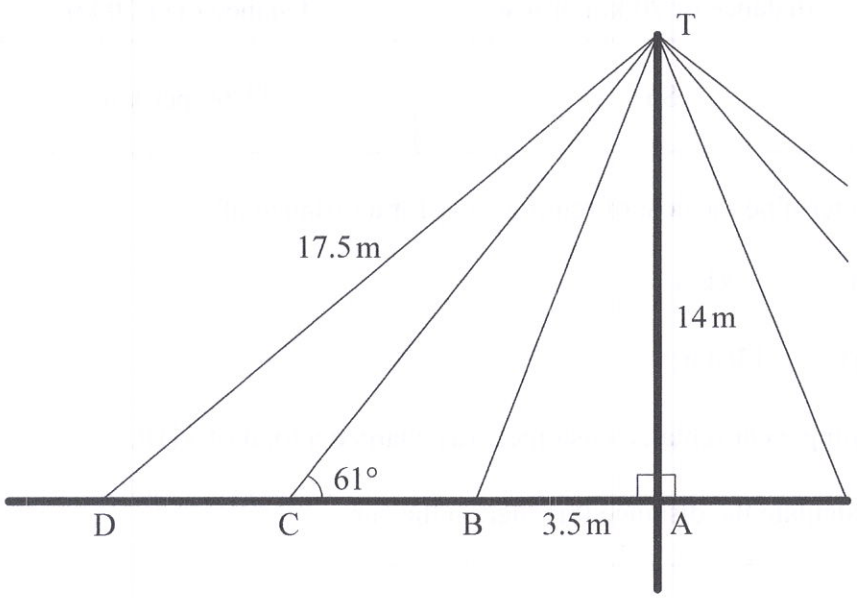
13. (a) Factorise completely $6xy^2 + xy - 5x^2y$ [3]

(b) Simplify (i) $\left(\frac{2m}{n^4}\right)^3$ [3]

(ii) $8 + 7(y - 5) - 4y$ [3]

---

14. The diagram below shows a section of a suspension bridge. The top, T, of the vertical tower, AT, is 14 m above the horizontal roadway. The suspension cable DT is of length 17.5 m. The suspension cable CT makes an angle of 61° with the roadway. The roadway section BA is of length 3.5 m.



Calculate

(a) the length of the roadway section DA, [3]

(b) the length of the suspension cable CT, [3]

(c) the angle ∠ATB. [3]

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

(a) Draw the following axes using a scale of 2 cm to 15 minutes on the x-axis for $9 \leq x \leq 11$ and 2 cm to 6 miles and on the y-axis for $0 \leq y \leq 60$. [2]

(b) Represent the following information on the graph.

Peter leaves *Super Savings Store* at 9:00 am to drive to *Discount Mart* which is 24 miles away.
He arrives at *Discount Mart* at 9:45 am.
He spends 15 minutes shopping and then drives to the *Stadium* which is 36 miles away.
He reaches the *Stadium* at 10:30 am. [3]

(c) Calculate Peter's average speed for the entire journey. [2]

(d) Kelly leaves the *Stadium* at 9:00 am and travels to *Super Savings Store*. Her average speed is 48 mph.

Represent this information on the same graph. [3]

(e) When **and** where do Peter and Kelly meet? [1]

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