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MATHEMATICS

PAPER 1 (CORE/EXTENDED)

Tuesday **23 MAY 2000** 1.00 – 2.30 P.M.

Additional materials:
calculator
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.

INFORMATION FOR CANDIDATES

Calculators 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.

1.



In a survey 14,638 persons were interviewed. .

Round this number to the nearest

(a) hundred,

Answer _____ [1]

(b) thousand.

Answer _____ [1]

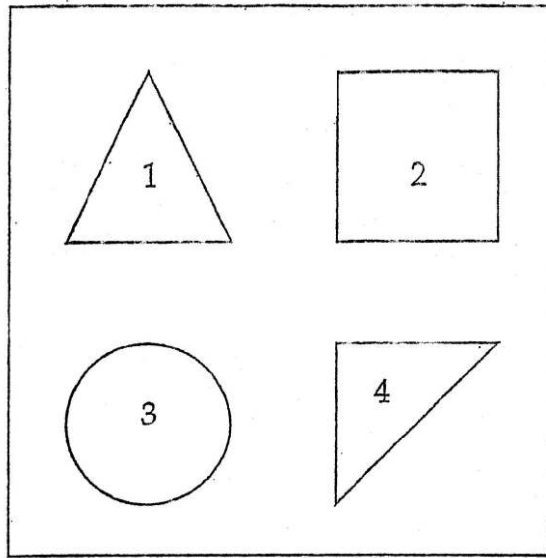
2. Solve

$$5x - 6 = 9$$

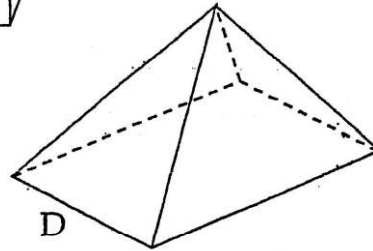
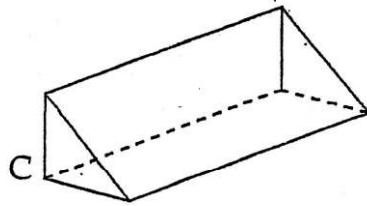
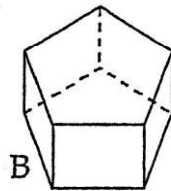
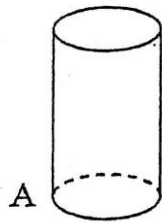
Answer _____ [2]

3.

Posting Holes for Objects

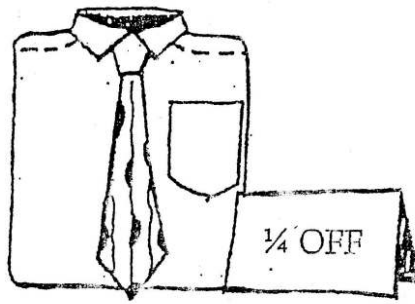


Match the object to the hole through which it can be posted.



Answer _____ [2]

4.



HILLS



GENERAL

Perry went shopping for a shirt. Both General and Hills department stores had the same shirt for \$29.00.

Calculate the sale price at .

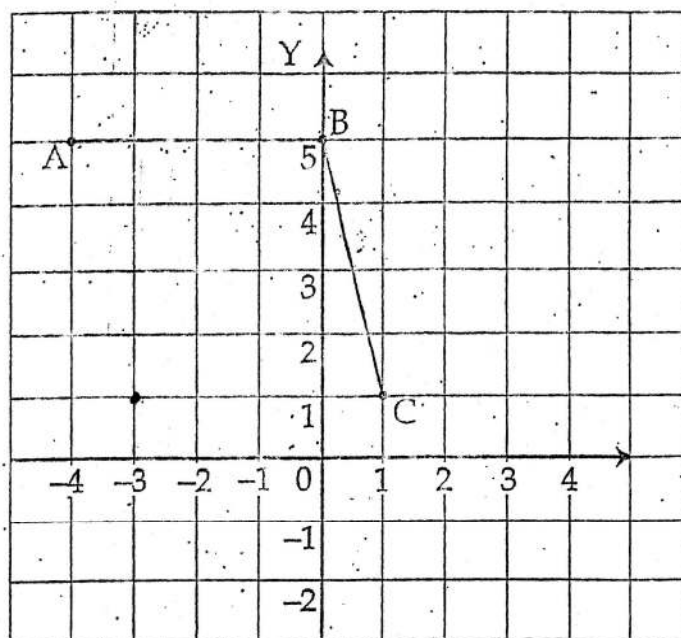
(a) General,

Answer \$ _____ [1]

(b) Hills.

Answer \$ _____ [2]

5.



- (a) Write down the coordinates of point A.

Answer _____ [1]

- (b) Plot the point $(-3, 1)$ and label it D.

[1]

- (c) Write down the special name of the shape ABCD.

Answer _____ [1]

6. (a) Write down the next two numbers in the series

4, 9, 14, 19, _____, _____.

Answer _____ [2]

- (b) From the above set of numbers, write down a prime number.

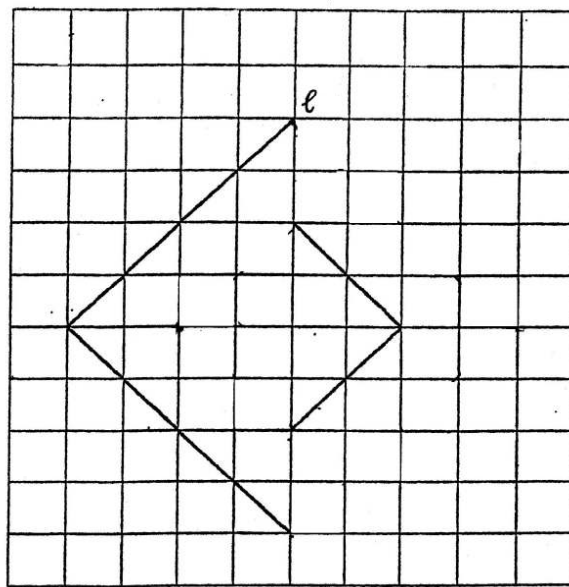
Answer _____ [1]

7. Calculate the value of:

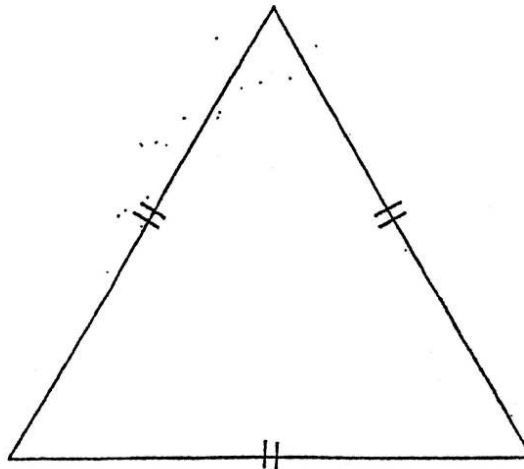
$$\sqrt{225} - 2$$

Answer _____ [3]

8. (a) ℓ is the line of symmetry. Complete the diagram. [2]



- (b) State the order of rotational symmetry of $\triangle ABC$



Answer _____ [1]

9. Express 28% as a

(a) fraction in its lowest terms,

Answer _____ [2]

(b) decimal.

Answer _____ [1]

10. In 1999, Sandra's monthly National Insurance contributions increased from \$36.82 to \$58.92.

Calculate

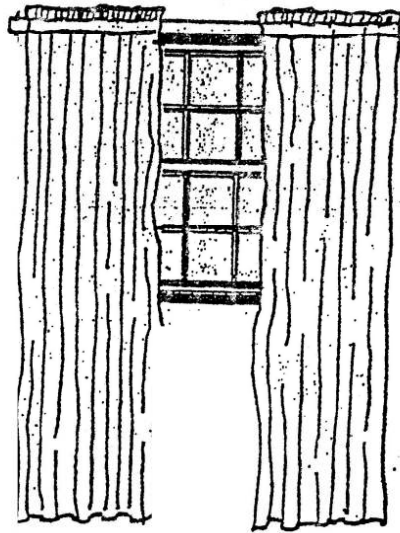
(a) the increase,

Answer \$ _____ [1]

(b) the percentage increase.

Answer _____ % [2]

11.



Mrs Rolle buys 8 yards of material to make some curtains. She cuts off four lengths of material each $1\frac{2}{3}$ yards long.

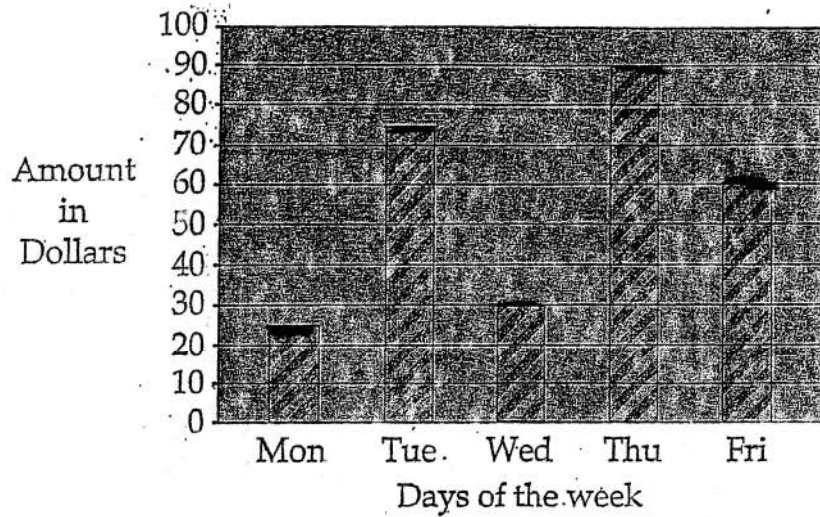
- (a) How many yards of material does she cut off?

Answer _____ yards [2]

- (b) How many yards are left?

Answer _____ yards [2]

12.



The chart shows the amount of money a straw vendor made during a certain week.

- (a) How much did she make on Monday?

Answer \$ _____ [1]

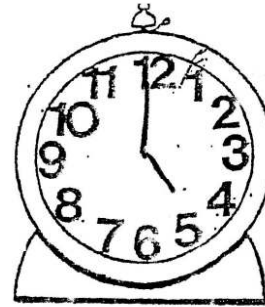
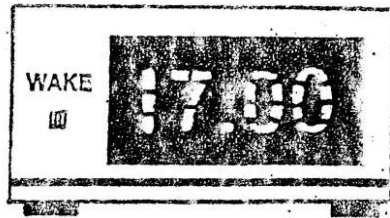
- (b) On which day did she make three times as much as on Wednesday?

Answer _____ [2]

- (c) Calculate the total amount she made for the week.

Answer \$ _____ [2]

13.



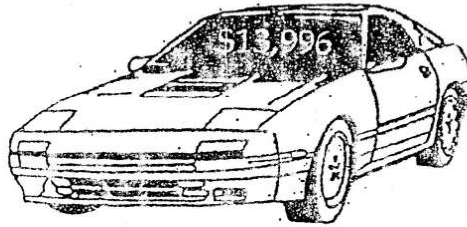
- (a) Draw the hands on the 12 hour clock to represent the time shown on the digital clock. [1]
- (b) Sue ran a race in 10 minutes 50 seconds.
- Bonnie ran the same race in 665 seconds.
- (i) Rewrite Sue's time in seconds.

Answer _____ seconds [2]

- (ii) Calculate the difference in their times.

Answer _____ [1]

14.



Last year Mr Caton bought a new car for \$13,996. At the end of the year the value of this car decreased by 20%.

Calculate

(a) the decrease;

Answer \$ _____ [2]

(b) the present value of the car.

Answer \$ _____ [2]

15. Given that $u = 7$ and $w = 4$,

calculate the value of

(a) $3u - w$,

Answer _____ [2]

(b) $\frac{u+5}{w}$.

Answer _____ [2]

16. Simplify

(a) $3 + 2(5y + 2) - 7y$

Answer _____ [3]

(b) $\frac{9ab}{15a^2}$

Answer _____ [2]

17.



In a school there are 875 students and 25 teachers.

- (a) Express as a ratio, the number of students to the number of teachers, in its simplest form.

Answer _____ [2]

Nine chicken snacks cost a total of \$31.50.

- (b) (i) Calculate the cost of one snack.

Answer \$ _____ [2]

Each teacher from this school bought a chicken snack.

- (ii) Calculate the total cost.

Answer \$ _____ [2]

18. (a) Julia went shopping. She wrote the following cheques.

		27/3/99
Pay to	<u>P. C. Limited</u>	<u>\$16.93</u>
sixteen	$\frac{93}{100}$	
		J. Toote

		27/3/99
Pay to	<u>M. M. Shoe Store</u>	<u>\$39.49</u>
thirty-nine	$\frac{49}{100}$	
		J. Toote

		27/3/99
Pay to	<u>Super Market Ltd</u>	<u>\$53.19</u>
fifty-three	$\frac{19}{100}$	
		J. Toote

		27/3/99
Pay to	<u>Bargain City</u>	<u>\$41.67</u>
forty-one	$\frac{67}{100}$	
		J. Toote

- (i) Calculate the total value of the four cheques.

Answer \$ _____ [2]

Before she went shopping she had \$216.40 in her account.

- (ii) How much money remained in her account after these cheques were cashed?

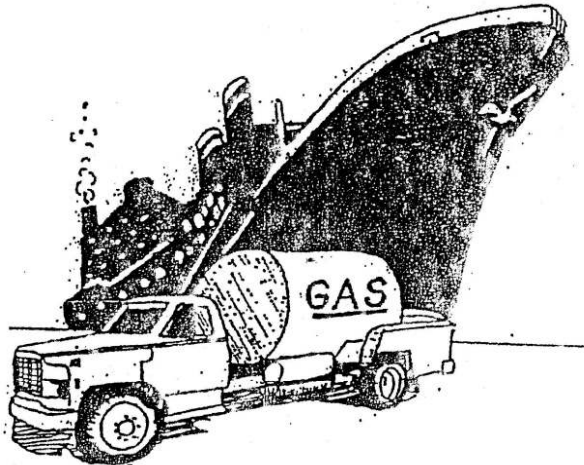
Answer \$ _____ [2]

- (b) A tourist went to the post office to purchase stamps for the United States. The postal clerk was given \$7.15.

How many 55¢ stamps did the tourist receive?

Answer _____ [2]

19.



To collect data for his class project, Gason went to the dock every afternoon for one week to take note of how many cruise ships were in the harbour.

His data is as follows:

2, 7, 1, 1, 5, 1, 4.

(a) Write down the

(i) mode,

Answer _____ [1]

(ii) median.

Answer _____ [1]

(b) Calculate the mean.

Answer _____ [2]

Each ship carried an average of 980 tourists.

(c) Calculate the approximate number of tourists that arrived by ships each week.

Answer _____ [2]

20. The table below shows the data from a newspaper survey. People were asked which of the newspapers they preferred to read.

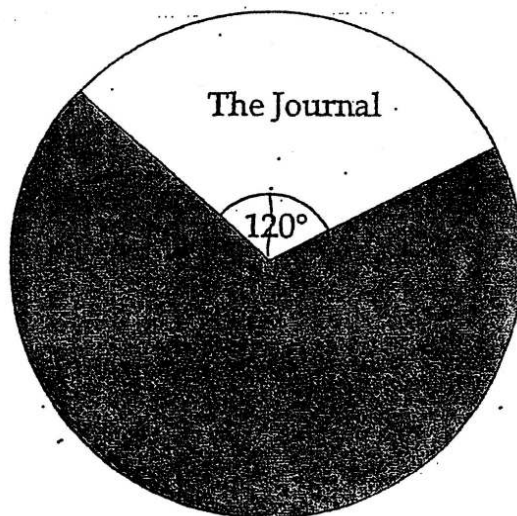
(a) Complete the table

	Newspaper	Number of People	Angle
(i)	The Journal	30	120°
(ii)	The Sun	25	
(iii)	The Times		140°

Answer (ii) _____ $^\circ$ [2]

(iii) _____ [3]

- (b) Use the information from the table and complete this pie chart.



[2]

21. (a) Construct the triangle ABC such that $AB = 8$ cm, $BC = 5$ cm and $AC = 6$ cm.

[3]

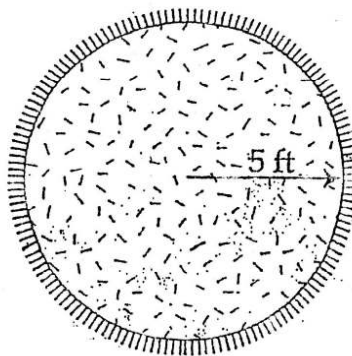
- (b) Construct the bisector of angle BAC to cut BC at X .

[3]

- (c) Measure and write down the length of AX .

Answer _____ cm [1]

22.

NOT TO
SCALE

A circular rug has a radius of 5 feet.

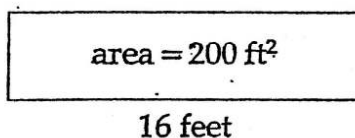
(a) Using $\pi = 3.14$, calculate its

(i) circumference,

Answer _____ ft [2]

(ii) area.

Answer _____ ft^2 [2]



The rug is placed on a rectangular floor 16 feet long. The area of the floor is 200 square feet.

(b) Calculate

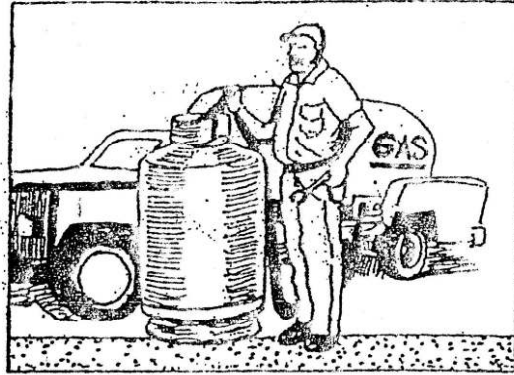
(i) the area of the uncovered portion of the floor,

Answer _____ ft^2 [1]

(ii) the width of the floor.

Answer _____ ft [2]

23.



Colin receives \$262.00 for a basic working week of 40 hours

- (a) Calculate his basic hourly rate.

Answer \$ _____ [2]

Overtime is paid at time and a half.

- (b) Calculate his overtime pay per hour to the nearest cent.

Answer \$ _____ [3]

- (c) Calculate the amount Colin earns in a week when he works 45 hours.

Answer \$ _____ [3]

MATHEMATICS

PAPER 2 (CORE/EXTENDED)

Thursday **25 MAY 2000** 9.00 – 11.00 A.M.

Additional materials:

- (a) calculator
- (b) geometrical instruments
- (c) answer booklet

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS
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INSTRUCTIONS TO CANDIDATES

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

Answer **ALL** questions in the answer booklet provided. **ALL** working must be shown.

ALL working must be done in blue or black ink.

INFORMATION FOR CANDIDATES

Calculators may be used. Geometrical instruments are required.

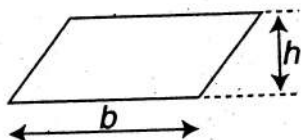
The mark for each question, or part question is shown in brackets [].

The total number of marks for this paper is 100.

INFORMATION AND FORMULAE

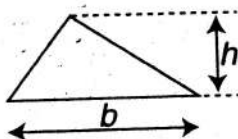
MENSURATION

Parallelogram



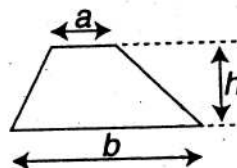
$$\text{Area} = bh$$

Triangle



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

Trapezium



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

Circle (radius r , diameter d)

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

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

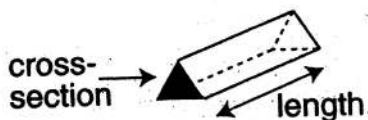
Cylinder (radius r , height h)

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

Prism

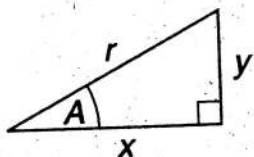
$$\text{Volume} = \text{area of cross-section} \times \text{length}$$

e.g. triangular prism

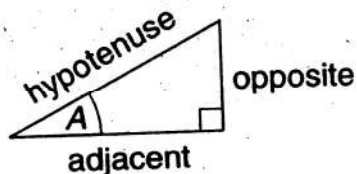


TRIGONOMETRY

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.

SECTION A
(43 marks)

Answer ALL questions in this section.

1. Arrange the following numbers in descending order.

$$3.5 \times 10^4 \quad 3.2 \times 10^5, \quad 8.9 \times 10^2, \quad 3.5 \times 10^{-5} \quad [3]$$

35000 320,000 890

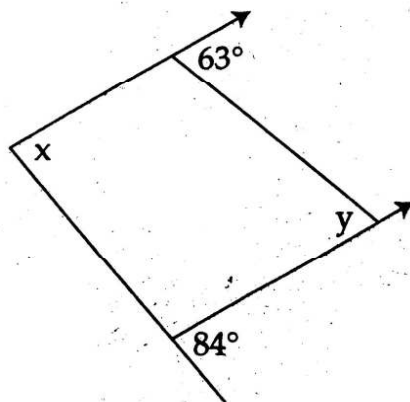
2. When five is added to a number "y" and then doubled the result is 36.

(a) Write an algebraic equation in terms of "y". [1]

(b) Solve your equation. [2]

3. (a)

NOT TO SCALE

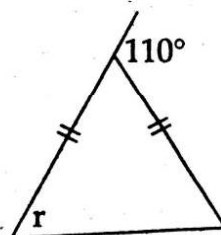


Find the value of

(i) x, [1]

(ii) y. [1]

- (b)



Find the value of r.

[2]

4. Simplify

(a) 3° , [1]

(b) $a^4 \times a^3$, [1]

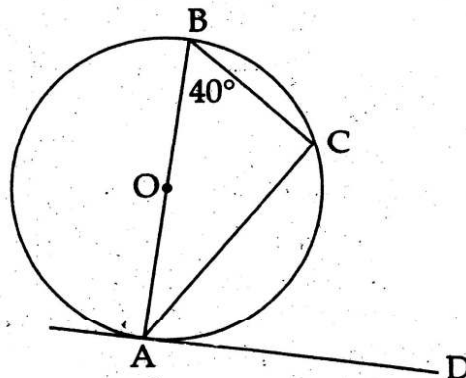
(c) $(1/4)^2$ [2]

5. Given that $v^2 = u^2 - 2as$,

(a) make "u" the subject of the formula. [2]

(b) Find the value of "u" when $v = 15$, $a = -2$ and $s = 50$. [2]

6.



NOT TO SCALE

AB is a diameter of the circle ABC with centre O.

AD is a tangent to the circle at A.

$\angle ABC = 40^\circ$.

(a) Calculate

(i) $\widehat{BAC}$, [1]

(ii) $\widehat{CAD}$. [1]

(b) Each interior angle of a regular polygon is 150° . Calculate the number of sides of this polygon. [2]



7. In a business, Mr Brown, Mr Jones and Mr Sands made investments of \$2,000, \$4,000 and \$1,500 respectively.

(a) Express their investments as a ratio in simplest form. [2]

A profit of \$300 was made in the first year. This profit was divided among them in the same proportion as their investments.

(b) Calculate Mr Jones' profit. [2]

-
8. Solve the following simultaneous linear equations

$$\begin{aligned} y &= 2x - 3 \\ 5x - y &= 13 \cdot 5 \end{aligned} \quad [5]$$

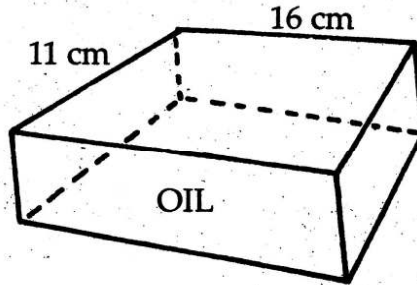
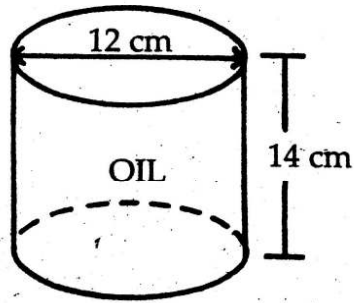
-
9. (a) Factorise completely

$$4a^2b - ab^2c \quad [2]$$

(b) Simplify

$$2(x - 3) - 4(x + 2) \quad [3]$$

10.



A cylindrical tin full of engine oil has a diameter of 12 cm and a height of 14 cm.

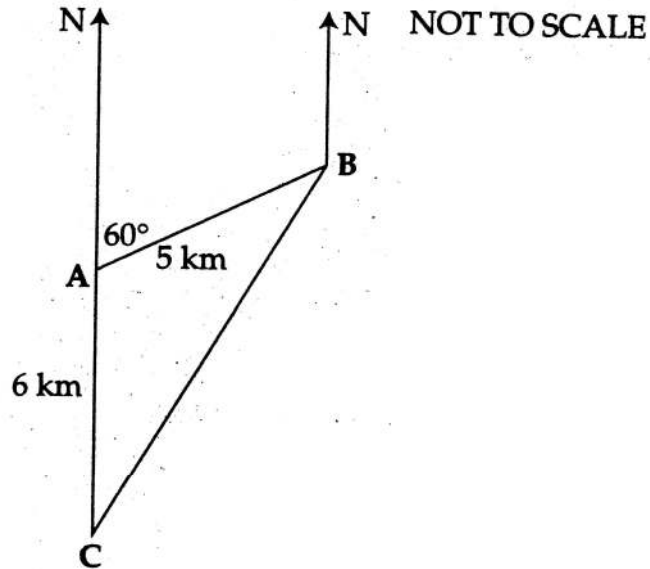
- (a) Calculate the volume of the cylindrical tin. [3]

The oil is poured into a rectangular pan 16 cm long and 11 cm wide.

- (b) Calculate the height of the oil in the pan correct to the nearest whole centimetre. (Take $\pi = 3.142$) [4]

SECTION B
(57 marks)

11.



A sailing race is over a triangular course, starting and finishing at the same point A. The first leg of the course (AB), is 5 km on a bearing of 060° from A to a buoy at B. The third leg (CA) is 6 km with C due south of A.

- (a) Make a scale drawing for the above information, using a scale of 1 cm to 1 km. [4]
- (b) Use the measurement from your diagram to find
- (i) the actual distance BC, [1]
- (ii) the bearing of C from B. [2]

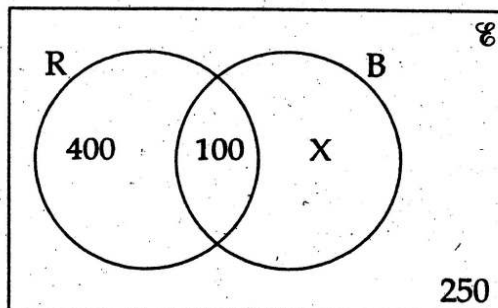
12. (a) In a survey, 1,000 people were asked which of two detergents Riz and Blew were used.

The diagram below represents the result.

$\mathcal{E} = \{ \text{people surveyed} \}$

$R = \{ \text{people who use Riz} \}$

$B = \{ \text{people who used Blew} \}$



- (i) Calculate the value of X . [2]

How many people used:

- (ii) Riz, [1]

- (iii) neither detergent. [1]

- (b) Given that

$$\mathcal{E} = \{ 2, 4, 6, 8, 10, 14, 16 \}$$

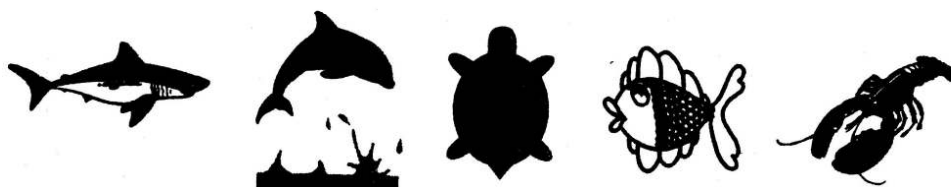
$$M = \{ 4, 16 \}$$

$$N = \{ 2, 4, 6, 8 \}$$

- (i) list the elements of $M \cap N'$ [2]

- (ii) Find $n(M \cup N)$. [2]

13.



A children's game is made up of 20 cards of four different colours; 5 red, 5 yellow, 5 blue, and 5 green. On each of the five cards of the same colour are drawn one of the following reef creatures; shark, dolphin, turtle, fish and lobster.

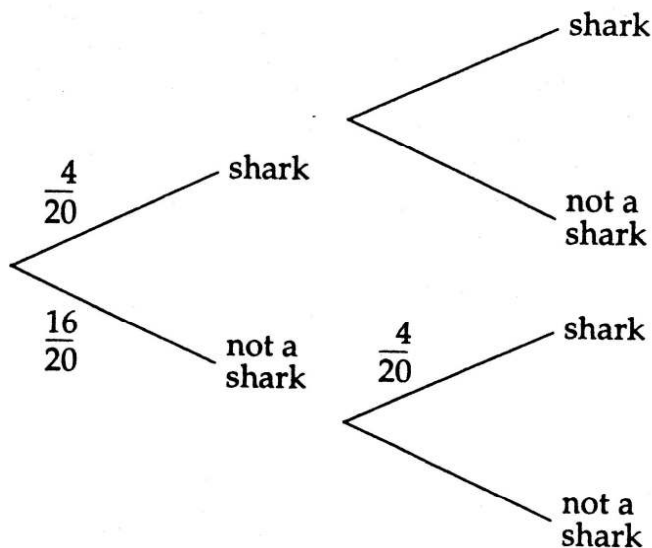
One card is drawn at random from this set.

(a) What is the probability that it is:

- (i) a blue dolphin, [1]
- (ii) any colour dolphin, [1]
- (iii) neither a dolphin nor a shark. [2]

(b) One card is drawn from the set of 20 cards and is replaced before another card is drawn.

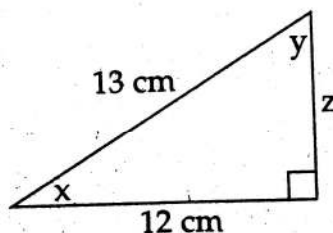
(i) Copy and complete the tree diagram.



[2]

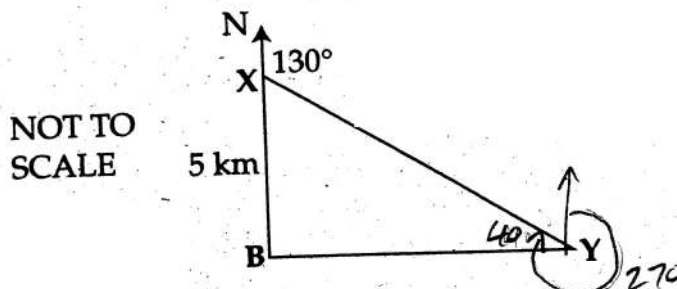
- (ii) Using the tree diagram, find the probability that both cards are sharks. [2]

14. (a) Given the right-angled triangle below,



calculate

- (i) the length of side z , [3]
 - (ii) angle y correct to one decimal place. [3]
- (b) A hiker sets out from base camp (B) heading due north, he walks for 5 km to a point X and then turns and walks on a bearing of 130° . He arrives at a check point (Y), which is due east of the base camp (B).



Calculate

- (i) $\angle BXY$, [1]
- (ii) the distance BY correct to 3 significant figures, [3]
- (iii) the bearing he must walk on from the check point (Y) back to base camp (B). [1]

15. (a) For the equation $y = x^2 - 4x - 9$, copy and complete the table of values below.

x	-2	-1	0	1	2	3	4	5
y	3	-4	-9	-12	-15	-12	-9	-4

[2]

- (b) Using a scale of 2 cm to represent 1 unit on the x axis and 1 cm to represent 1 unit on the y axis, draw the graph of $y = x^2 - 4x - 9$ for values of x from -2 to +5. [4]
- (c) Draw in the line of symmetry on this curve. [1]
- (d) On the same axes, draw the graph of $y = x - 9$. [2]
- (e) Write down the coordinates of the points where the line $y = x - 9$ intersects the curve $y = x^2 - 4x - 9$. [2]

16. Answer the whole of this question on graph paper.

- (a) Using a scale of 1 cm to represent 1 unit on each axis, draw x and y axes from $-8 \leq x \leq 10$ and $-6 \leq y \leq 10$. Draw and label the triangle ABC with A(2, 2), B(4, 2) and C(5, 4). [3]
- (b) A rotation through 90° clockwise about the origin maps ABC onto $A_1B_1C_1$. Draw and label $A_1B_1C_1$. [2]
- (c) Draw an enlargement of ABC, scale factor 2, centre the origin. Label it $A_2B_2C_2$. [2]
- (d) Triangle ABC is reflected in the line $x = -1$. Draw and label it $A_3B_3C_3$. [2]
- (e) A transformation maps ABC onto $A_4B_4C_4$ with $A_4(0, 7)$, $B_4(2, 7)$, $C_4(3, 9)$.
- (i) Draw and label $A_4B_4C_4$. [1]
- (ii) Describe fully this transformation. [2]

MATHEMATICS

PAPER 3 (EXTENDED)

Tuesday **30 MAY 2000** 9.00 – 11.30 A.M.

Additional materials:

- (a) calculator
- (b) geometrical instruments
- (c) answer booklets

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS
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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 Initial in the spaces provided on 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.

INFORMATION FOR CANDIDATES

Calculators may be used.

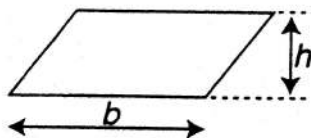
The mark for each question, or part question is shown in brackets [].

The total number of marks for this paper is 100.

INFORMATION AND FORMULAE

MENSURATION

Parallelogram



$$\text{Area} = bh$$

Circle (radius r , diameter d)

Cylinder (radius r , height h)

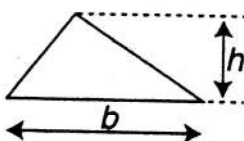
Sphere (radius r)

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

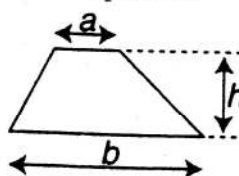
Volume

Volume

Volume

Area of curved surface

Trapezium



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

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

$$= \pi r^2$$

$$= \pi r^2 h$$

$$= 2\pi r h$$

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

$$= 4\pi r^2$$

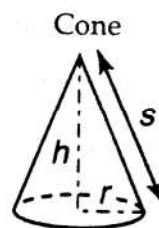
$$= \text{area of cross-section} \times \text{length}$$

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

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

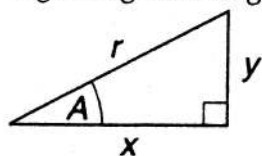
$$= \pi rs$$

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

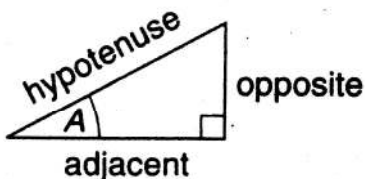


TRIGONOMETRY

Right-angled triangle

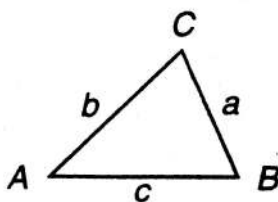


$$r^2 = x^2 + y^2 \text{ (result of Pythagoras)}$$



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

Any triangle



$$\begin{aligned} \text{In any triangle ABC: } \frac{a}{\sin A} &= \frac{b}{\sin B} = \frac{c}{\sin C} \\ a^2 &= b^2 + c^2 - 2bc \cos A \\ \cos A &= \frac{b^2 + c^2 - a^2}{2bc} \end{aligned}$$

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

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

SECTION A
(52 Marks)

1. The length and width of a rectangle are 8 cm and 5 cm respectively. **To the nearest whole number**, calculate the smallest possible area of the rectangle. [2]
-

2. A vehicle travelled 3,300 m in 2 minutes 56 seconds. Calculate the average speed in km/h. [3]
-

3. Matrices A and B are defined as follows:

$$A = \begin{pmatrix} 1 & 4 \end{pmatrix}, \quad B = \begin{pmatrix} 2 \\ -3 \end{pmatrix}.$$

Calculate the matrix products

- (a) AB. [1]
- (b) BA. [2]
-

4. Express as a single fraction in simplest form,

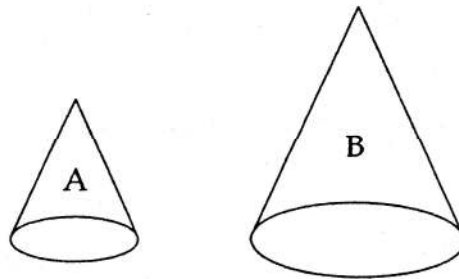
$$\frac{3}{x-1} + \frac{2}{2-x}. \quad [4]$$

5. For the curve $y = 3x^2 + 5x - 2$

calculate

- (a) the expression for the gradient, $\frac{dy}{dx}$, [2]
- (b) the value of x at which the tangent to the curve is parallel to the x axis. [2]
-

6.



Two cones A and B are of similar shape.

The ratio of their heights is 2 : 3.

The surface area of the smaller cone A is 44 cm^2 .

- (a) Calculate the surface area of the larger cone. [2]

The volume of the larger cone B is 243 cm^3 .

- (b) Calculate the volume of the smaller cone. [3]

7. The function h is defined as $h: x \rightarrow \frac{x+3}{2}$.

(a) Calculate the value of

(i) $h(x)$ when $x = -3$, [1]

(ii) x when $h(x) = 4$. [2]

(b) Find $h^{-1}: x \rightarrow$. [2]

8. In a class of 30 students, the mean age of the 12 boys is 16 years 8 months and the mean age of the 18 girls is 15 years 10 months. Calculate the mean age of the entire class, giving your answer in years and months. [5]

9. The variables q and t are related such that

$$q = \frac{3^t}{54}.$$

(a) Calculate, as a fraction, the value of q

(i) when $t = 0$, [1]

(ii) when $t = -1$. [2]

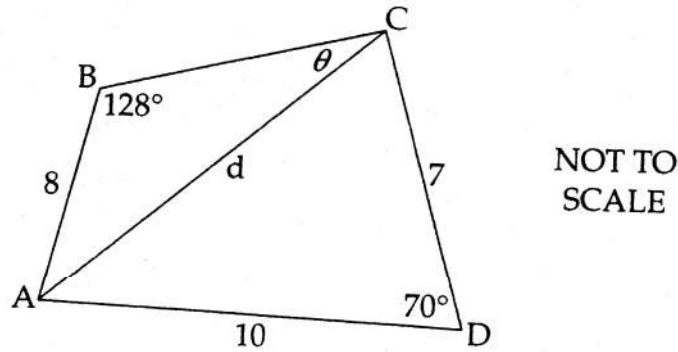
(b) Calculate the value of t when $q = 1.5$. [3]

10. A quadratic equation is given as $x^2 - px + 3 = 0$.

(a) When $x = -2$ is one of the roots of the equation, calculate the value of p . [3]

(b) Calculate the roots of the equation when $p = 4$. [4]

11.



In the quadrilateral ABCD, $AB = 8$ cm, $AD = 10$ cm and $CD = 7$ cm. $\angle B = 128^\circ$ and $\angle D = 70^\circ$.

Calculate, to the nearest whole number,

(a) the distance d , [4]

(b) the angle θ . [4]

SECTION B
(48 marks)

12. In a furniture store, the terms of the hire-purchase plan are:

- (i) 20% down payment of the cash price,
 - (ii) 10% is then added to the balance (the remainder of the cash price) to make the total balance,
 - (iii) the total balance to be paid in 12 equal monthly payments.
- (a) The cash price of a suite of furniture is \$2,475. Mrs Rolle buys it under the hire-purchase plan.

Calculate

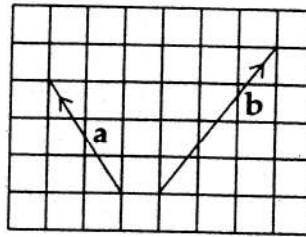
- (i) the down payment, [1]
- (ii) the balance plus interest, [3]
- (iii) the monthly payments. [1]

- (b) Mrs Wright also buys a suite of furniture under the hire-purchase plan. Her payments are \$154 per month.

Calculate

- (i) the total balance, [1]
- (ii) the balance before interest, [2]
- (iii) the cash price, [2]
- (iv) the total amount Mrs Wright paid under the hire-purchase plan. [2]

13. Answer the whole of this question on graph paper.



The vectors **a** and **b** are represented on a 1 cm grid.

- (a) Using a scale of 1 cm to 1 unit on each axis, draw the axes so that $0 \leq x \leq 16$ and $0 \leq y \leq 16$. [1]

X is the point (9, 5).

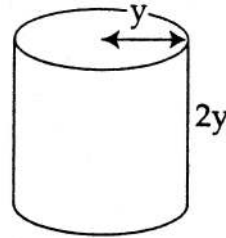
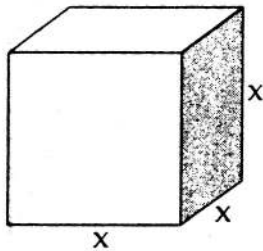
- (b) At the point x, draw and label the vectors $\vec{xy}$ and $\vec{xz}$ such that $\vec{xy} = \mathbf{a}$ and $\vec{xz} = \mathbf{b}$. [2]
- (c) Express in column matrix form the vectors **a** and **b**. [2]
- (d) Draw and label the vector $\vec{xv}$ such that $\vec{xv} = \mathbf{a} + \mathbf{b}$. [2]
- (e) Draw and label the vector $\vec{xw}$ such that $\vec{xw} = 2\mathbf{a} - \mathbf{b}$. [2]
- (f) Calculate $|\vec{xw}|$, the magnitude of $\vec{xw}$. [2]
- (g) Calculate $\vec{YZ}$ in terms of **a** and **b**. [1]

14. A company wants to ship material in quantities of 125 cm^3 by volume.

The company has to decide whether it should be in the shape of a cube or a cylinder.

If it is a cylinder, the radius must be half the height.

Because it is a corrosive material, the surface area must be a minimum.



- (a) For a cube, calculate
- (i) the length of a side, [2]
 - (ii) the surface area. [2]
- (b) For a cylinder, calculate (use $\pi = 3.142$)
- (i) the radius, to 1d.p., [3]
 - (ii) the surface area. [4]
- (c) Which shape meets the criteria of the company? [1]

15. The following is an incomplete table of values for the graph $y = 2 + \frac{3}{x}$.

x	0.5	1		2	2.4	3	4	5	6
y	8	5	4.5	3.5	3.25	3	2.75		2.5

- (a) Calculate
- the missing y-value, [1]
 - the missing x-value. [2]
- (b) Using a scale of 2 cm to 1 unit on each axis for $0 \leq x \leq 7$ and $0 \leq y \leq 9$, draw the graph of $y = 2 + \frac{3}{x}$. [4]
- (c) Using the same scale and axes, draw the graph of $y = 8 - x$. [2]
- (d) From your graph, estimate the two values of x where the curve and line intersect. [2]
- (e) Shade the region for which $y < 8 - x$ and $y = 2 + \frac{3}{x}$. [1]