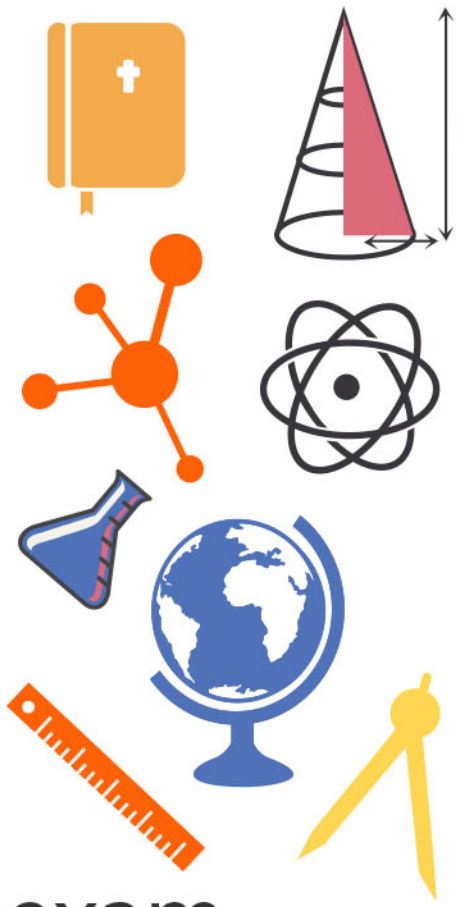

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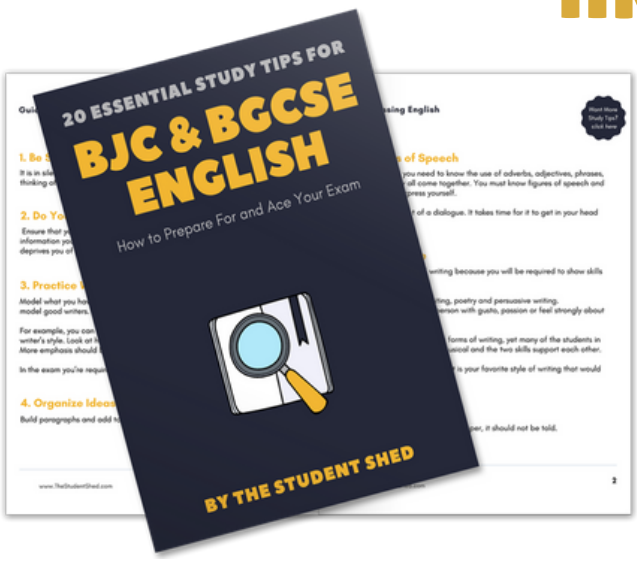

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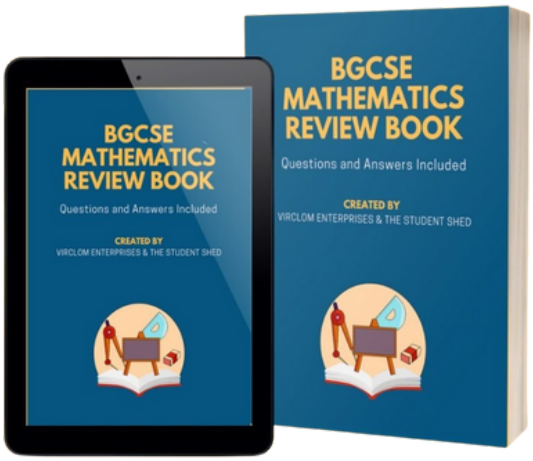

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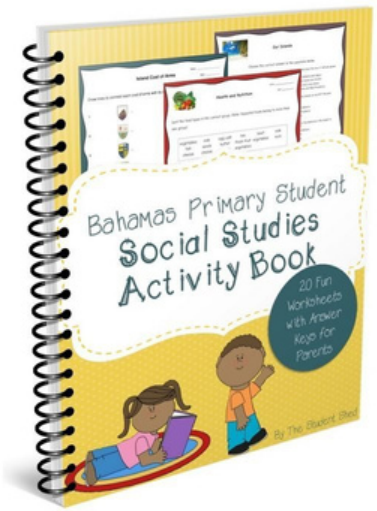

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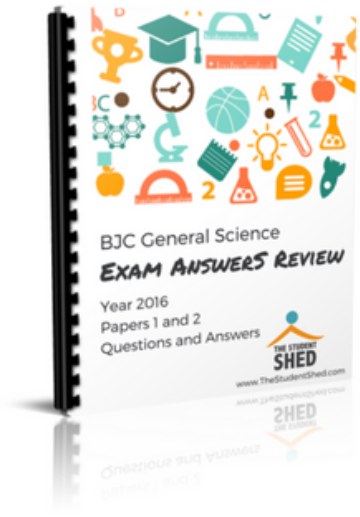

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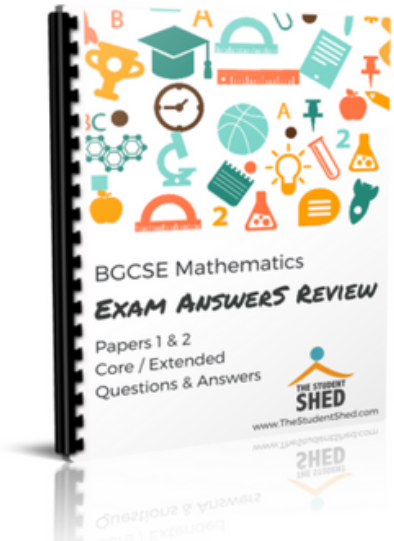

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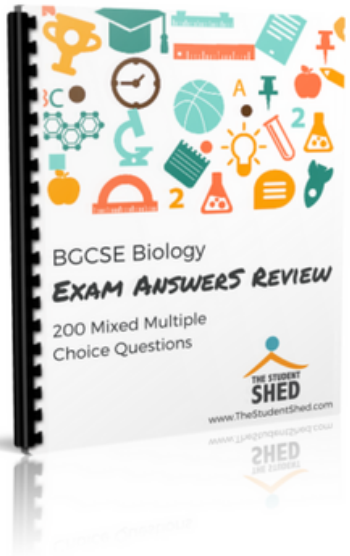

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3815/1 **BGCSE**

School Number	Candidate Number
Surname and Initials	

MATHEMATICS

PAPER 1 (CORE/EXTENDED) 3815/1

Tuesday 19 MAY 2009 1.00 – 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.

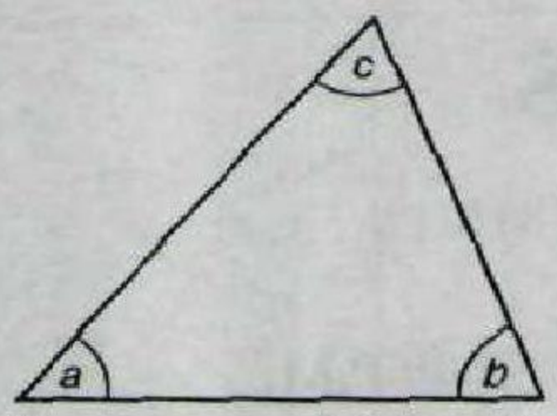
Geometrical instruments are required.

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

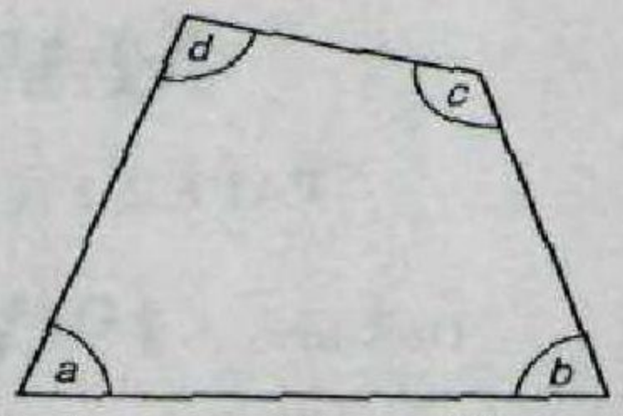
The total number of marks for this paper is 100.

This question paper consists of 17 printed pages and 3 blank pages.

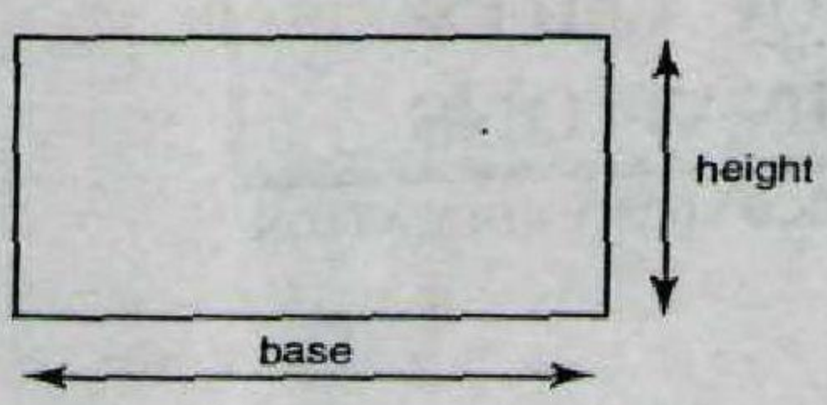
INFORMATION AND FORMULAE



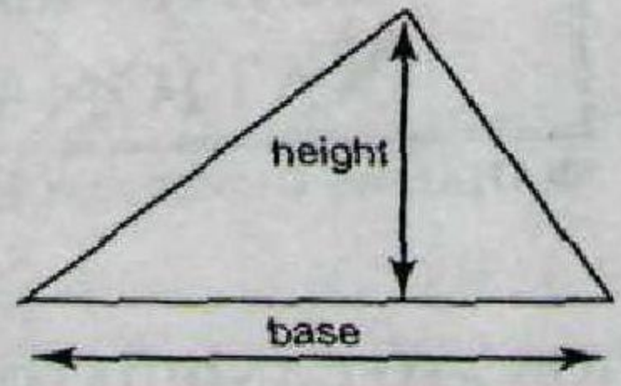
Angle sum of triangle
$a + b + c = 180°$



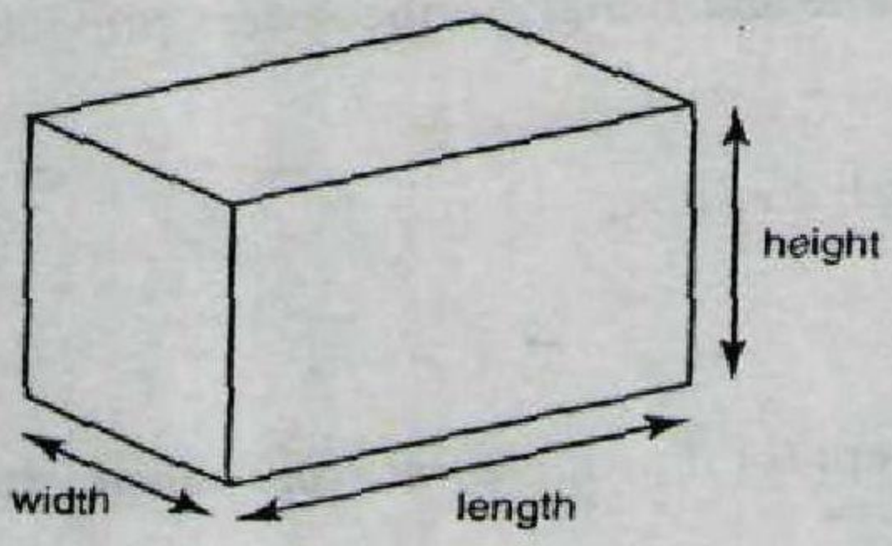
Angle sum of quadrilateral
$a + b + c + d = 360°$



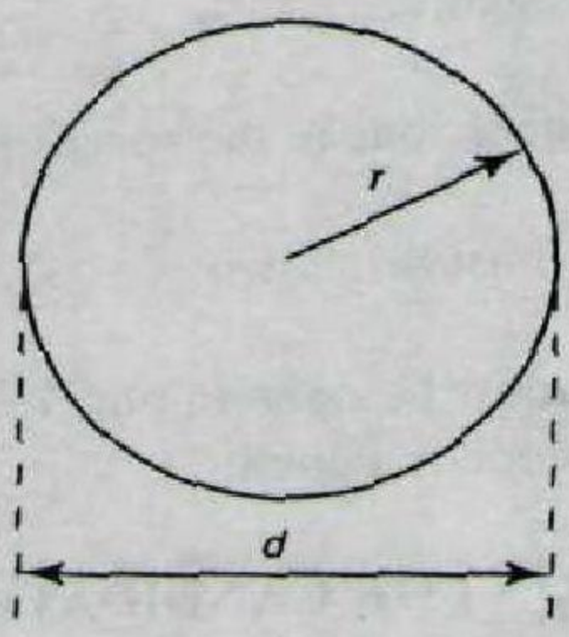
Area of rectangle = base × height



Area of triangle = $\frac{\text{base} \times \text{height}}{2}$

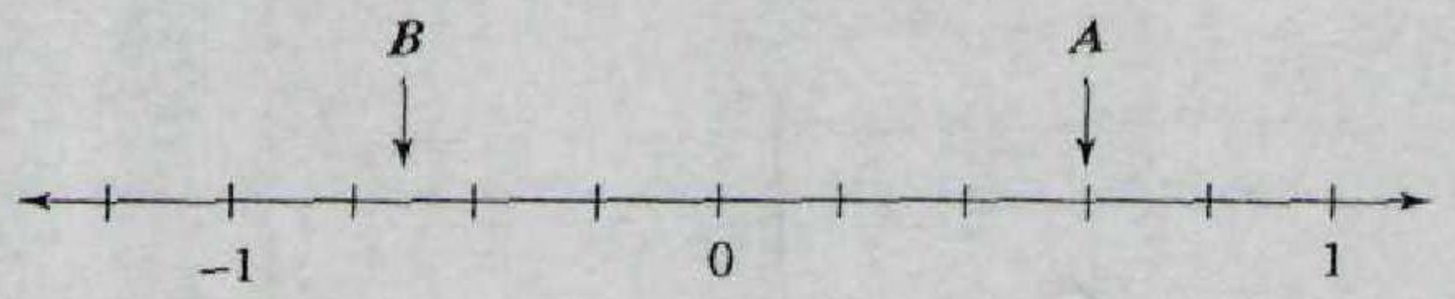


Volume of cuboid = length × width × height



Circumference of circle = $2\pi r$ or πd
Area of circle = πr^2

1. The positions for the values of A and B are indicated on the number line below.



Write down the value of

(a) A,

Answer _____ [1]

(b) B.

Answer _____ [1]

---

2. Three yeast cells were placed in a laboratory dish at 2:00 p.m. The number of yeast cells doubles every ten minutes.

Calculate the number of cells in the dish after one hour.

Answer _____ cells [1]

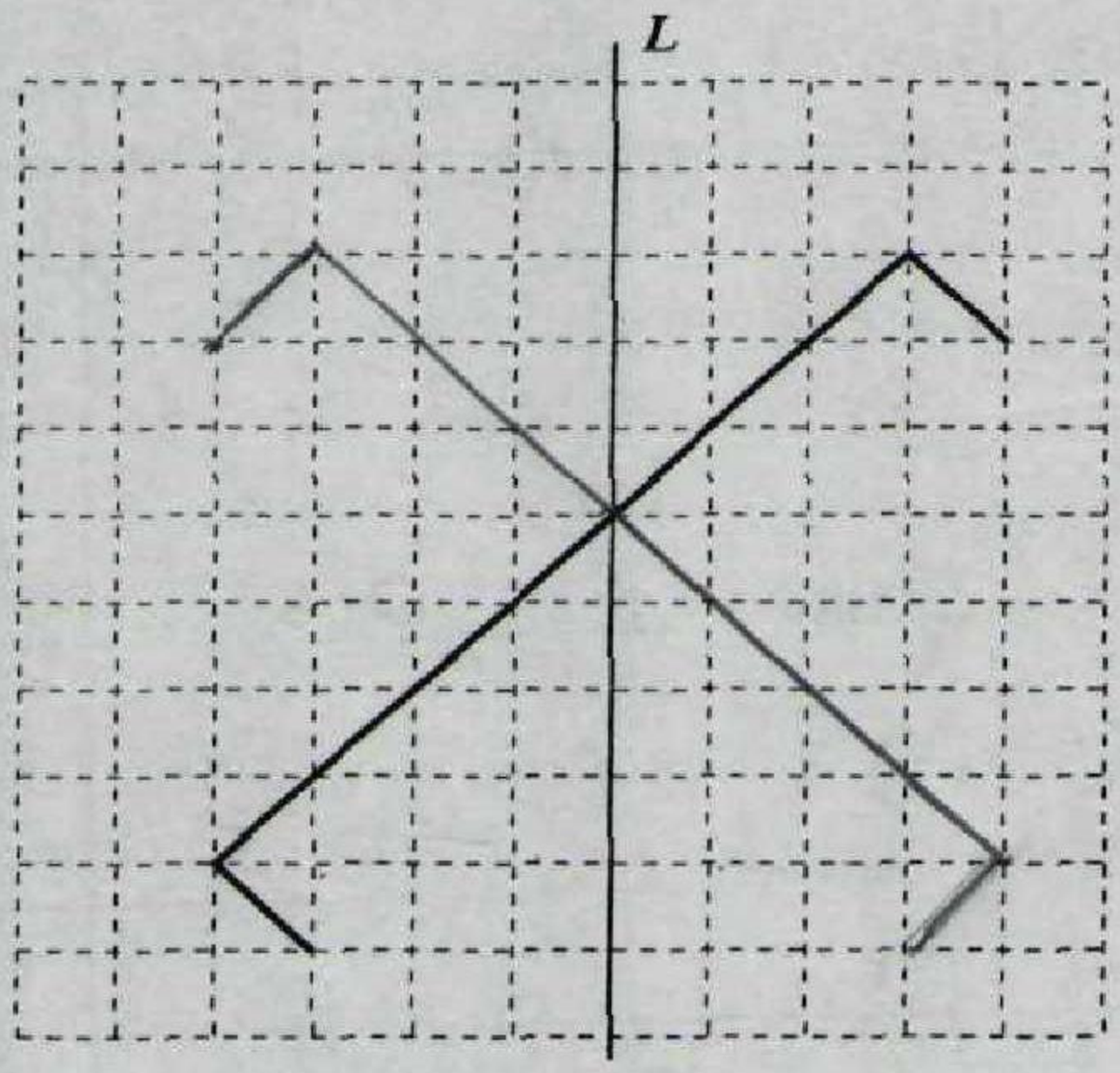
---

3. Calculate the fraction that is halfway between $\frac{1}{4}$ and $\frac{1}{2}$.

Answer _____ [1]

---

4. Complete the diagram so that it is symmetrical about the line L.



[2]

---

5. Simplify

(a) $21 - 3 \times 4$

Answer _____ [1]

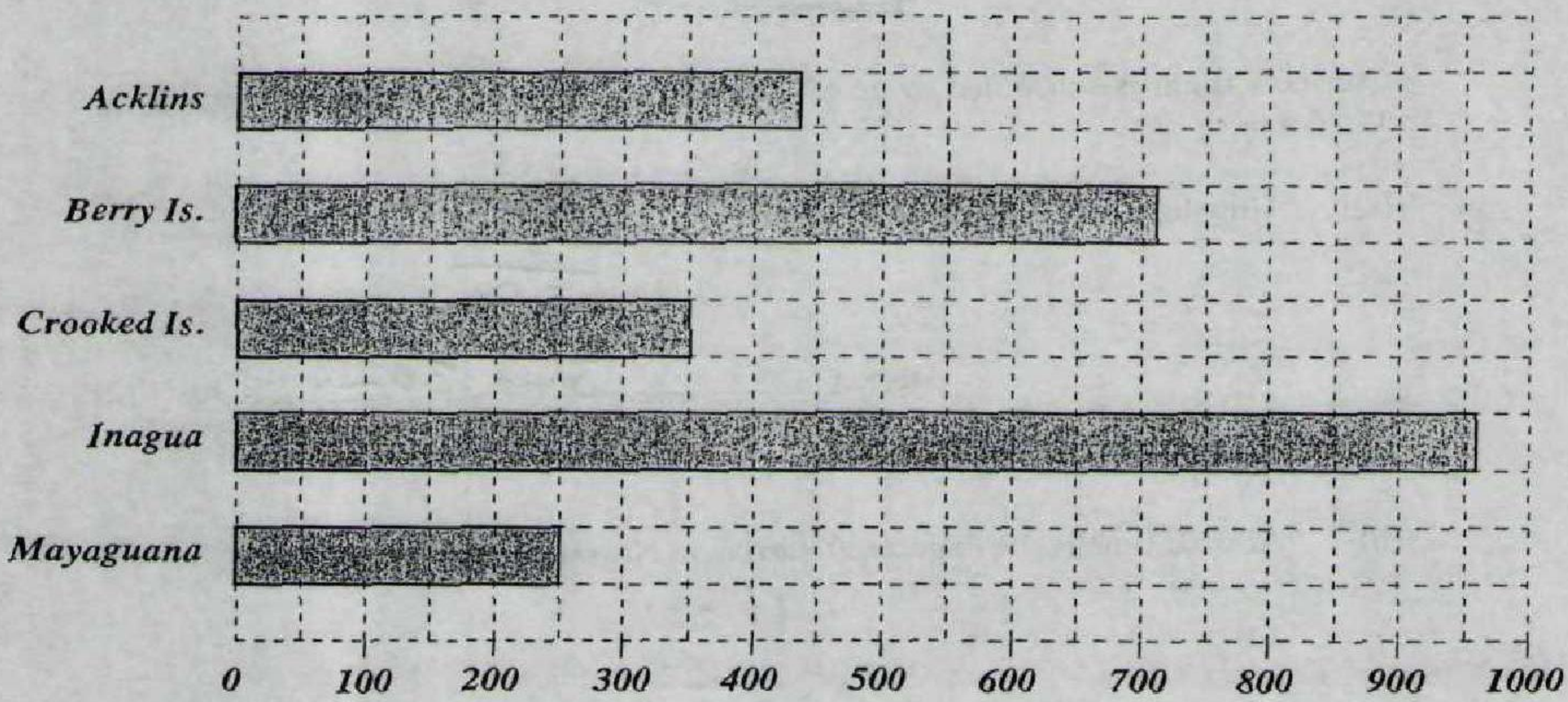
(b)

$$\frac{15+7}{13-2}$$

Answer _____ [1]

---

6. The bar chart below shows the population figures of the smaller Family of Islands from the last census.



(a) Using the bar chart, estimate and write down to the nearest 10, the population of

(i) Crooked Island,

Answer _____ [1]

(ii) Berry Island.

Answer _____ [1]

(b) Write down the name of the island that has **about**

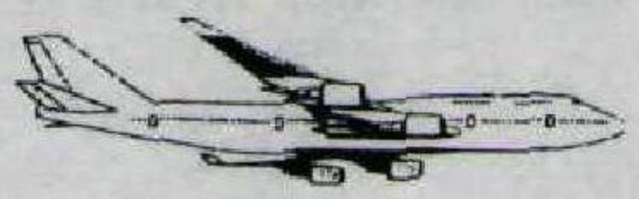
(i) three times the population of Mayaguana,

Answer _____ [1]

(ii) one-third the population of Inagua.

Answer _____ [1]

7.



Corrine's flight is scheduled to leave Chicago at 7:50 a.m. and arrive in Nassau at 11:20 a.m.

(a) How long is her scheduled flight?

Answer _____ hrs. [2]

The flight is delayed 45 minutes.

(b) At what time is she expected to arrive in Nassau?

Answer _____ p.m. [2]

---

8. Solve the following equations.

(a) $8x - 5 = 27$

Answer $x =$ _____ [2]

(b) $\frac{y}{9} = \frac{5}{6}$

Answer $y =$ _____ [2]

---

9. Copper and zinc are melted together in the ratio 3:2 to make the alloy, brass. Calculate the amount of

(a) copper in 660 *g* of brass,

Answer _____ *g* [2]

(b) zinc, when the alloy contains 372 *g* of copper.

Answer _____ *g* [2]

---

10. Jason spent ***b*** dollars in *The Book Store*. He spent three times as much in *The Shoe Store* as he did in *The Book Store*. He spent $12 more in *The Music Store* than at *The Book Store*. Write an expression in terms of ***b*** for

(a) the amount spent in *The Shoe Store*,

Answer $ _____ [1]

(b) the amount spent in *The Music Store*,

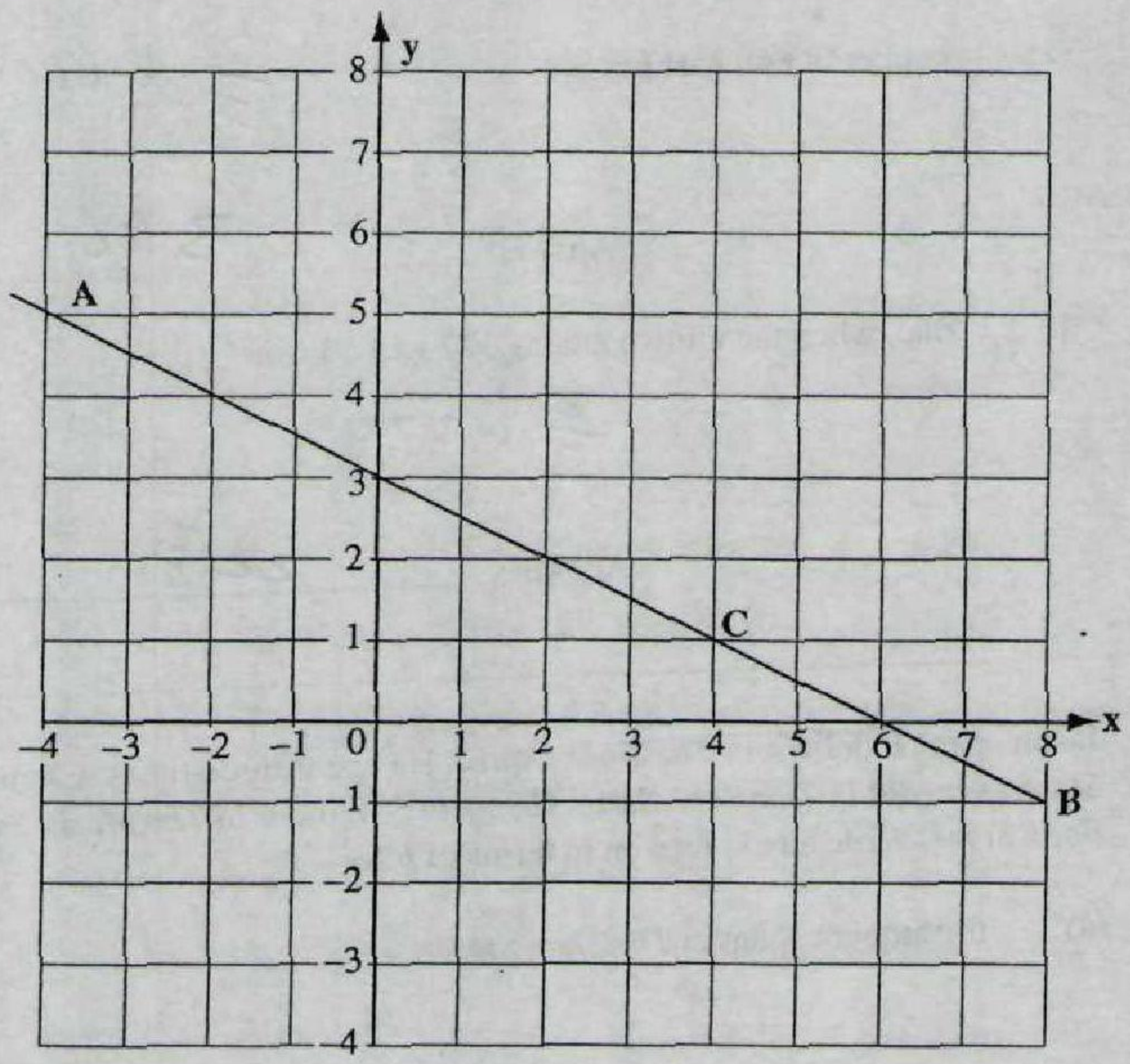
Answer $ _____ [1]

(c) the total amount that Jason spent, giving your answer in simplest form.

Answer $ _____ [2]

---

11. The graph of the line **AB** is drawn below. **C** is a point on the line.



(a) For the line **AB**, write down

(i) the value of x where it crosses the x-axis,

Answer _____ [1]

(ii) the value of y when $x = -2$,

Answer _____ [1]

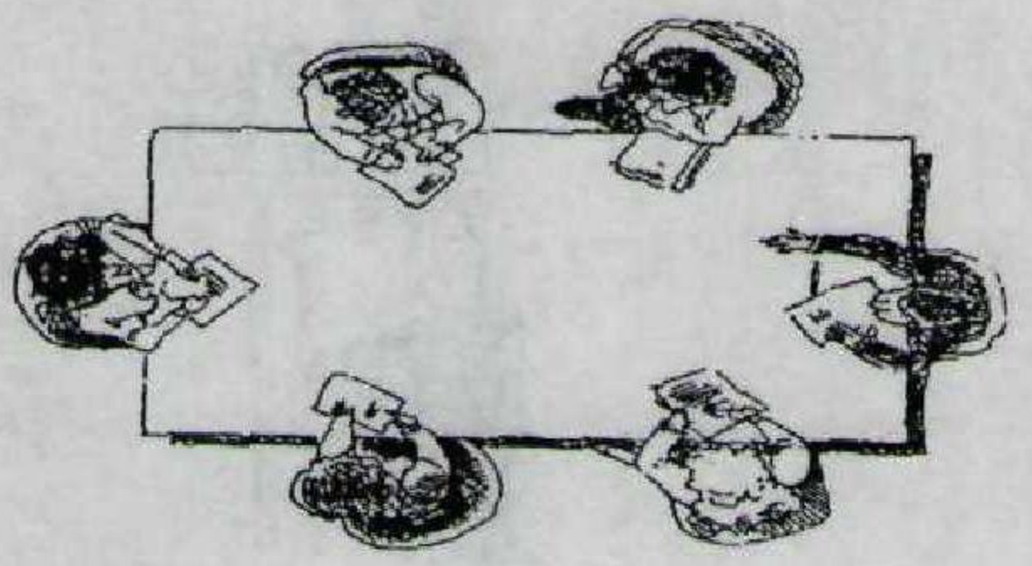
(iii) the coordinates of the point **C**.

Answer _____ [1]

(b) Draw a line through the point **C**, perpendicular to the line **AB**.

[1]

12.



There are thirteen candidates in a speech competition. To determine the order of presentation, numbers from 1 to 13 are placed in a bag and each candidate, in turn, randomly selects a number.

1	2	3	4	5	6	7
8	9	10	11	12	13	

List the cards which show

(a) (i) odd numbers,

Answer _____ [1]

(ii) factors of 9,

Answer _____ [1]

(iii) square numbers.

Answer _____ [1]

(b) Write down the probability that the first candidate to pick a number selects

(i) a prime number,

Answer _____ [1]

(ii) a multiple of 3.

Answer _____ [1]

13.

John borrowed $7,200 from his bank at 9.5% simple interest per annum for three years.

(a) Calculate

(i) the interest on the loan,

Answer $ _____ [2]

(ii) the total amount repaid.

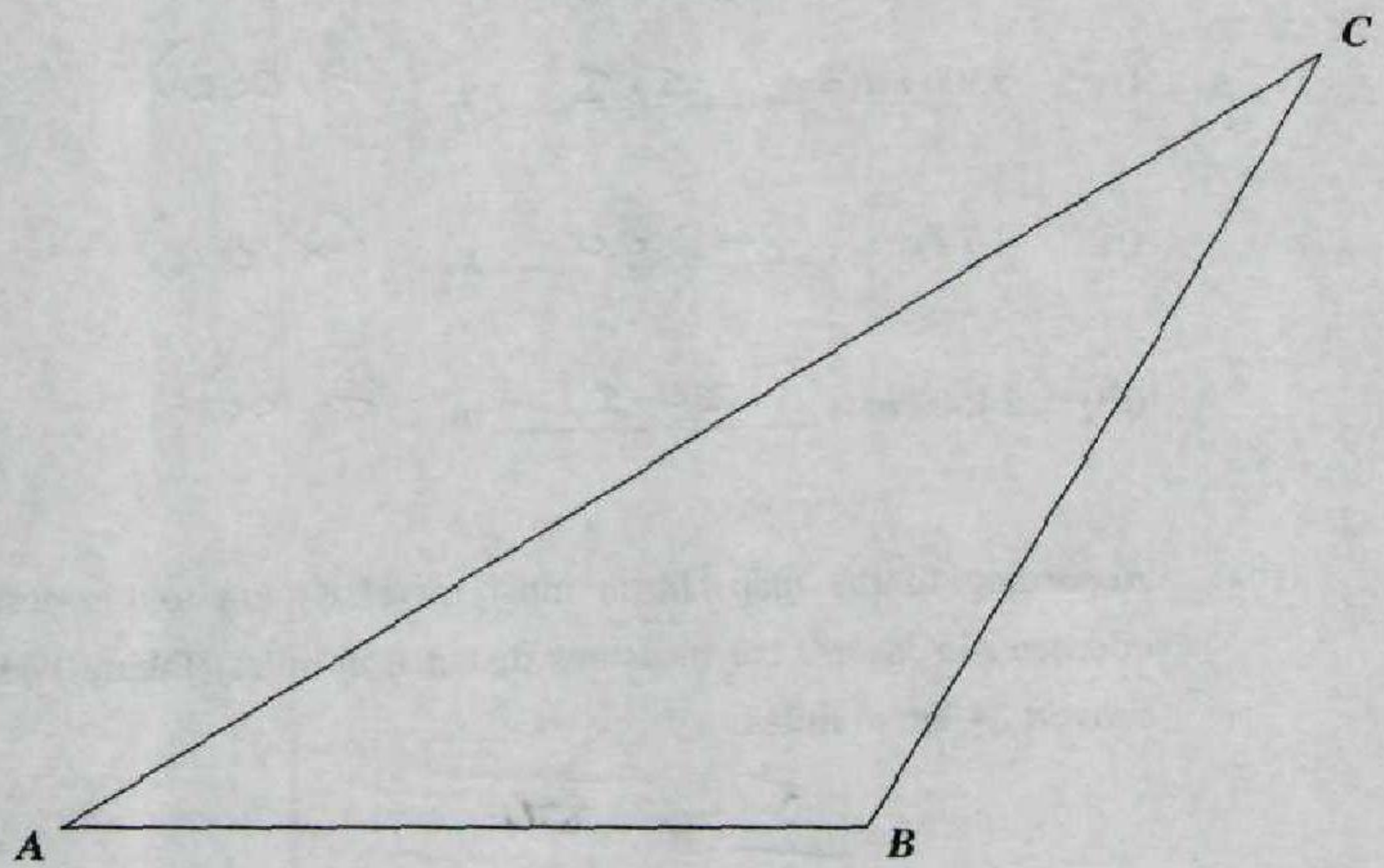
Answer $ _____ [1]

John makes equal monthly payments on the total amount to be repaid during the time period of the loan.

(b) Calculate his monthly payment.

Answer $ _____ [2]

14. Triangle ABC is shown below.



(a) Using a protractor, measure and write down the size of $\angle A$.

Answer _____° [1]

(b) Measure and write down the length of BC in centimetres.

Answer _____ cm [1]

(c) Using a pencil, ruler and compasses only, bisect $\angle B$.

[3]

15. (a) Complete the following conversions

(i) 5300 *ml* = _____ *l*, [1]

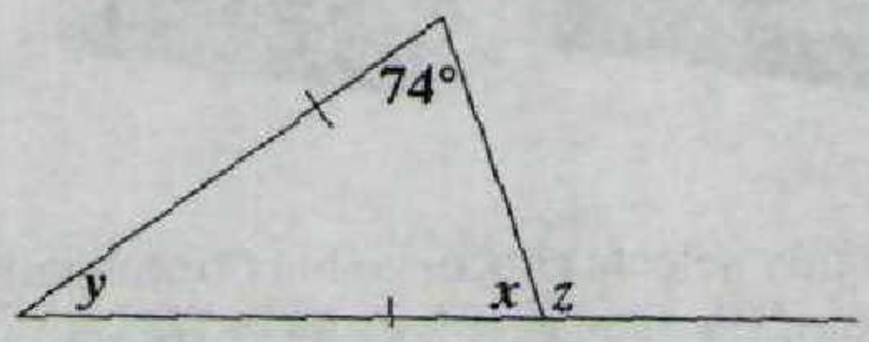
(ii) 4.7 *kg* = _____ *g*, [1]

(iii) 3450 *cm* = _____ *m*. [1]

(b) According to the map, Jason must travel 84 km to his destination. The odometer in Jason's car measures distance in miles. Taking 1 km = $\frac{5}{8}$ miles, convert 84 km to miles.

Answer _____ miles [2]

16. Calculate the size of



NOT TO SCALE

(a) (i) angle x,

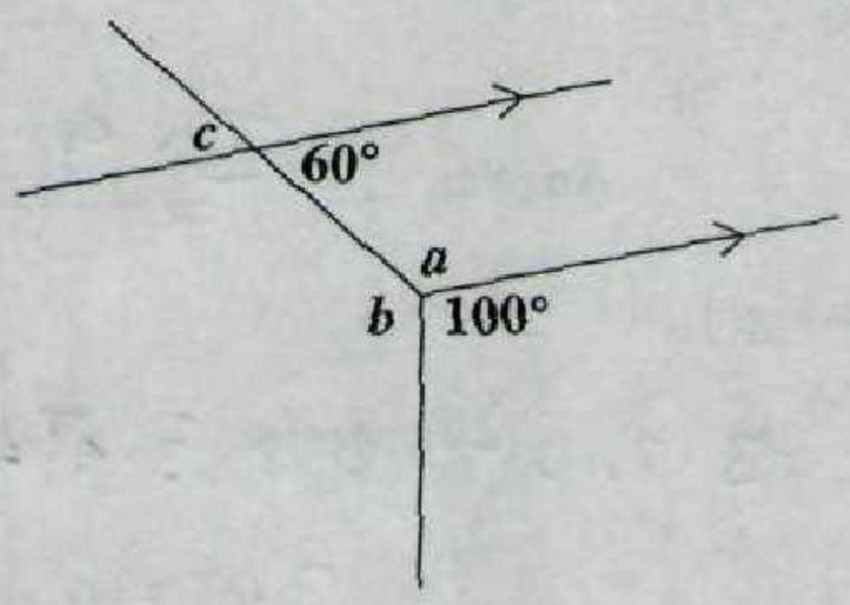
Answer _____° [1]

(ii) angle y,

Answer _____° [1]

(iii) angle z.

Answer _____° [1]



NOT TO SCALE

(b) (i) angle a,

Answer _____° [1]

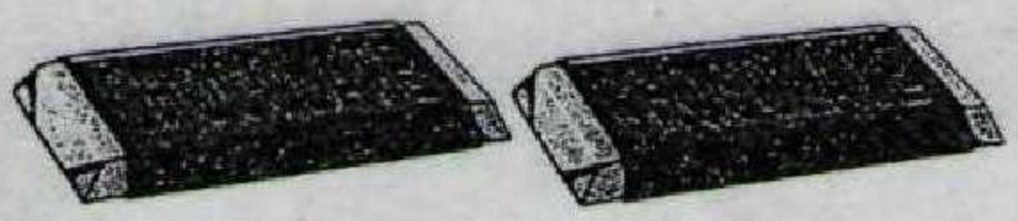
(ii) angle b,

Answer _____° [1]

(iii) angle c.

Answer _____° [1]

17.



Quality Control randomly selects chocolate bars from their production line. The weights, in ounces, of the selected chocolate bars are:

4.1, 4.0, 3.8, 3.9, 3.7, 4.0, 3.7, 4.0

Calculate

(a) the mean weight,

Answer _____ ozs. [2]

(b) the median weight,

Answer _____ ozs. [3]

(c) the modal weight.

Answer _____ ozs. [1]

18. Express as a fraction in lowest terms,

(a) $\frac{45}{120}$

Answer _____ [2]

(b) 8%

Answer _____ [2]

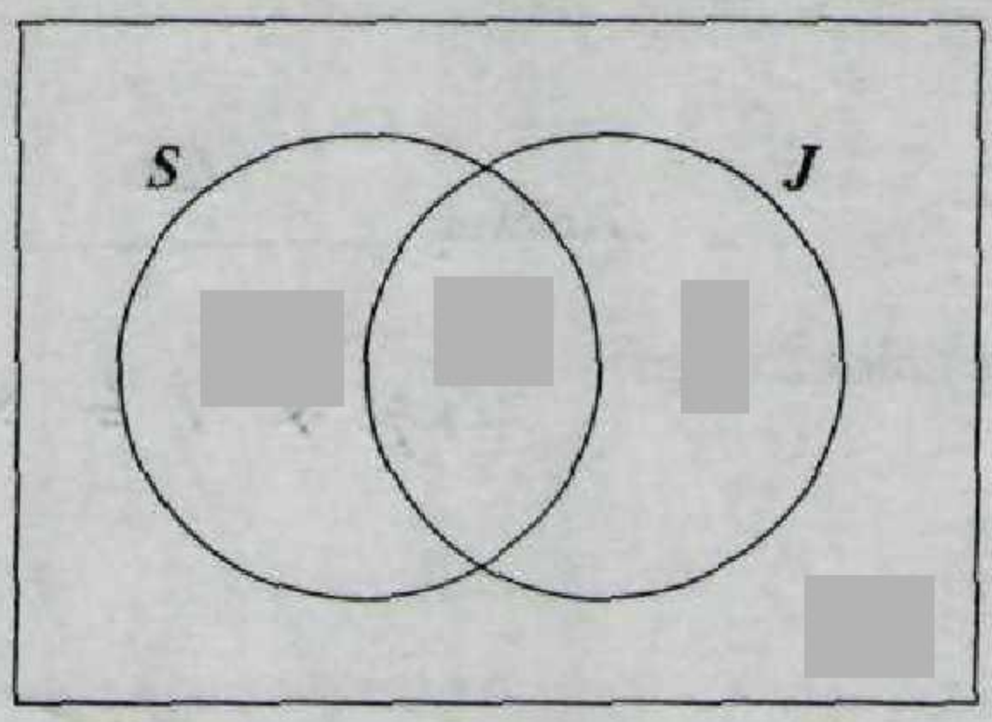
(c) 0.875

Answer _____ [2]

---

19. Errol did a survey in his class on the radio stations ***Slash 93.7 (S)*** and ***Jay 101.7 (J)***. Fifteen students listen to both stations. Twenty-two listen to ***Slash***. Six listen to ***Jay*** only. There are 32 students in the class.

(a) Enter the above data in the Venn diagram below.



[4]

(b) Using the information in your Venn diagram, write down the number of students who listen to

(i) only ***Slash***,

Answer _____ students [1]

(ii) neither ***Slash*** nor ***Jay***.

Answer _____ students [1]

---

20. Janet is paid $7.60 per hour for a regular 40-hour week. Overtime hours are paid at time and a half. The chart below is a record of the hours Janet worked last week.

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Hours	8	7	9	9	10

Calculate

(a) the regular earning for the five days,

Answer $ _____ [1]

(b) the overtime hours worked,

Answer _____ hours [1]

(c) the overtime earnings,

Answer $ _____ [3]

(d) the total earnings for the week.

Answer $ _____ [1]

21. Simplify

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

Answer _____ [3]

(b) $(3z^2)(2z^3)$

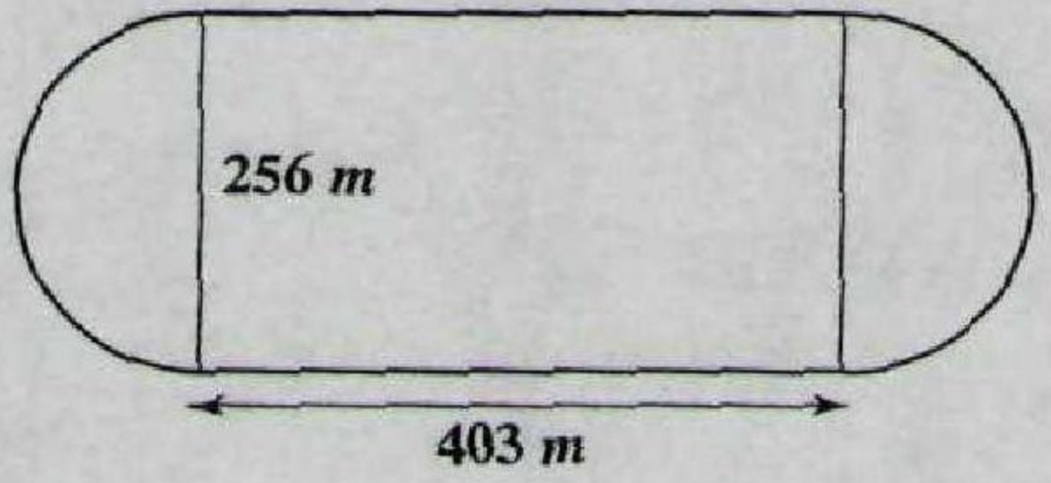
Answer _____ [2]

(c) $\dfrac{21a^3b}{35ab}$

Answer _____ [2]

---

22. The diagram represents the inside turf of the ***Hobby Horse Race Track***. It is made up of a rectangle of dimensions 403 *m* by 256 *m*, and two semicircular ends.



Using $\pi = 3.14$, calculate

(a) the distance around the turf,

Answer _____ *m* [4]

(b) the area of the turf.

Answer _____ m^2 [4]

MATHEMATICS

PAPER 2 (CORE/EXTENDED) 3815/2

Thursday 21 MAY 2009 9.00 – 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

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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].**

Geometrical instruments are required.

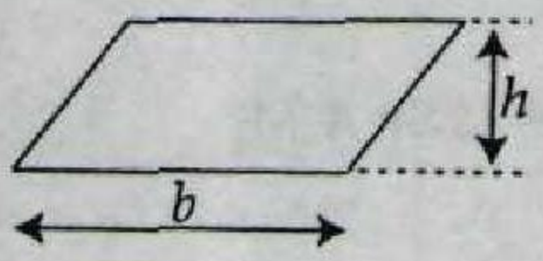
The mark for each question, or part question is shown in brackets [ ].

The total number of marks for this paper is 100.

INFORMATION AND FORMULAE

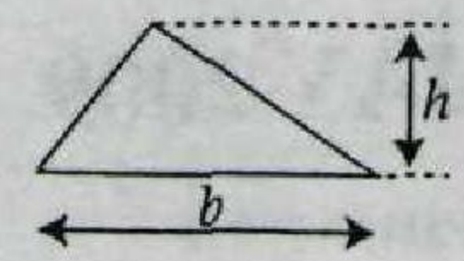
MENSURATION

Parallelogram



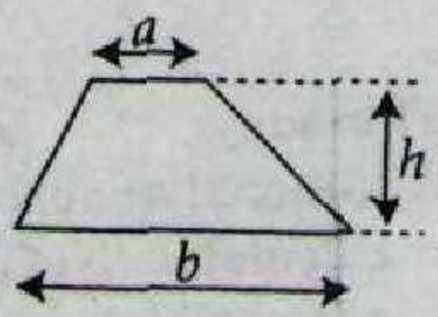
Area = bh

Triangle



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

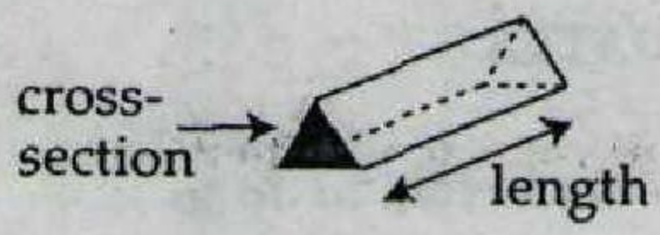
Trapezium



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

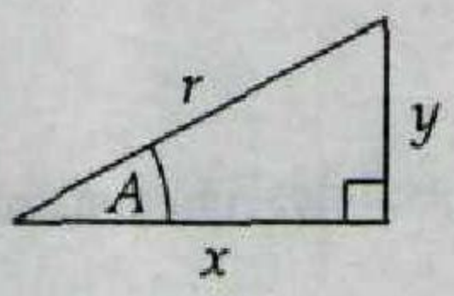
Circle (radius r, diameter d)	Circumference	$= 2\pi r$ or πd
	Area	$= \pi r^2$
Cylinder (radius r, height h)	Volume	$= \pi r^2 h$
Prism	Volume	= area of cross-section × length

e.g. triangular prism

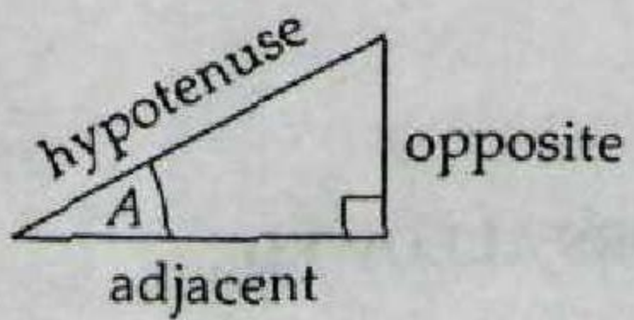


TRIGONOMETRY

Right-angled triangle



$r^2 = x^2 + y^2$, (result of Pythagoras)



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

1. Express this ratio in its simplest form.

$2.25 : 50¢

[2]

---

2. Write 0.7952 correct to

(a) the nearest whole number, [1]

(b) two decimal places, [1]

(c) three significant figures. [1]

---

3. Express the following inequality statements algebraically.

(a) "x is more than 57", [1]

(b) "p is smaller than twice q", [1]

(c) "z is at least 33". [1]

---

4. Sue bought 3.5 yards of material at $8.70 per yard and 5 yards of lace trim. She spent $32.90 in total. Calculate the cost of 1 yard of lace trim.

[4]

---

5. A formula for conversion between temperatures is:

$$C = \frac{5}{9}(F - 32)$$

(a) Calculate C when $F = 63.5$. [2]

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

---

6. Solve the following pair of simultaneous equations.

$$7x - 3y = 27$$
$$y = 4 - 2x$$

[5]

7.

For this question, give your answers in scientific notation (standard form).

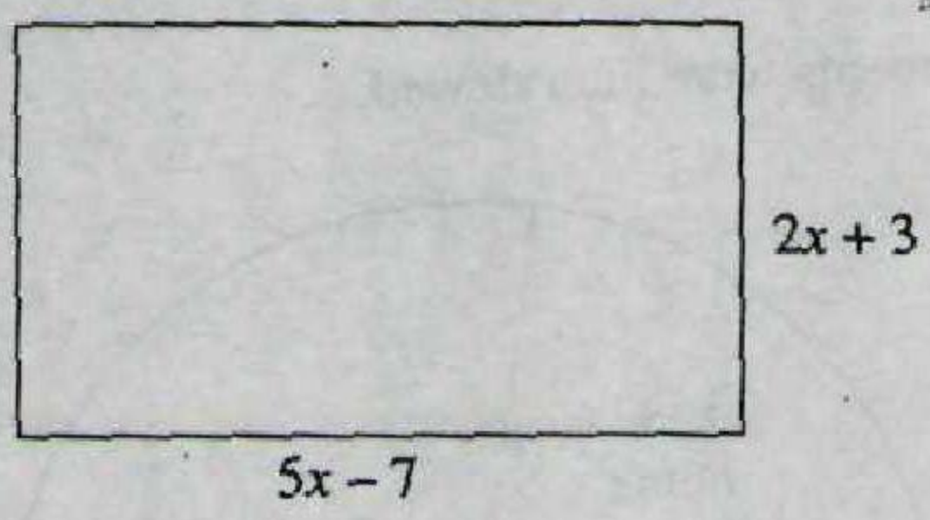
An oil exporting country has estimated crude oil reserves of about 2.615×10^{11} barrels.

(a) A barrel contains 42 gallons. Estimate the amount of crude oil reserves in gallons. [3]

(b) An oil tanker holds 250,000 barrels of crude oil. Estimate the number of shiploads of crude oil reserves. [3]

---

8. A rectangle has sides of length $5x - 7$ and $2x + 3$ centimetres.



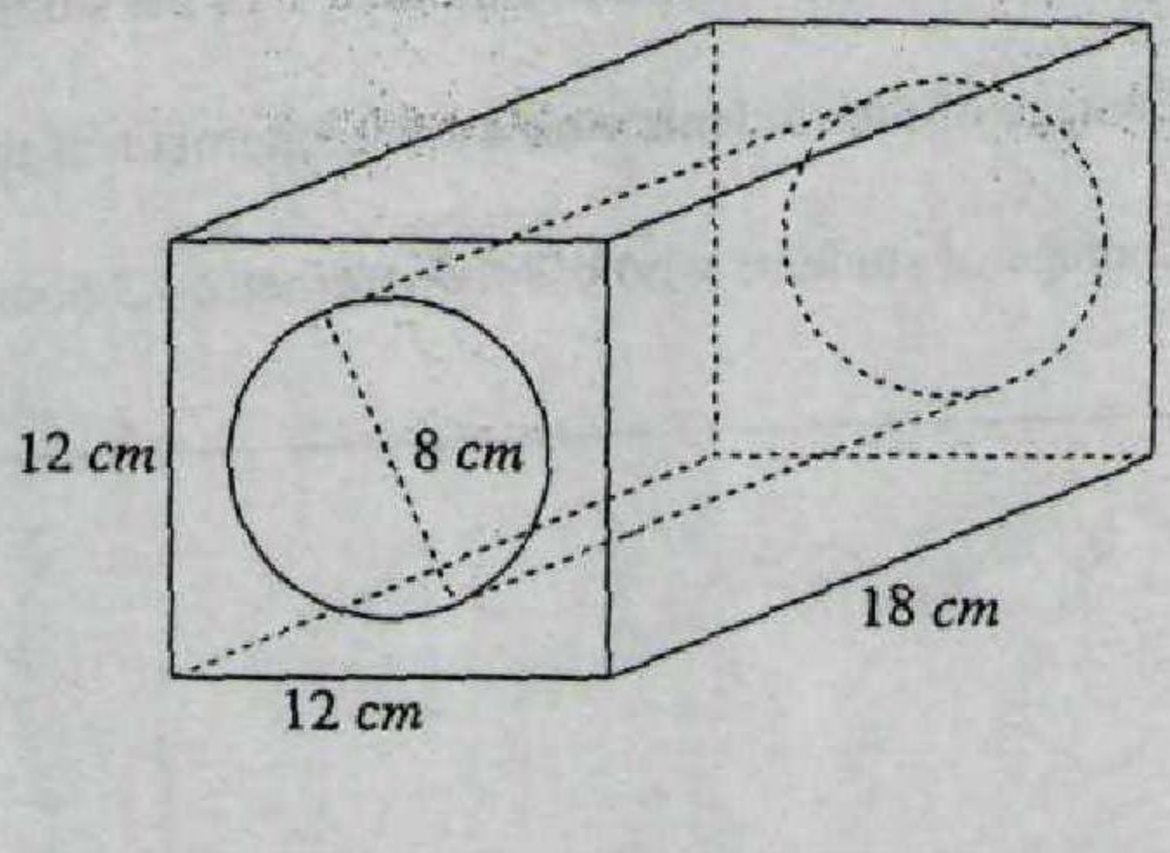
(a) Write down and simplify an expression in terms of x for the perimeter of this rectangle. [3]

(b) The perimeter is 90 cm. Form an equation then use it to find the value of x. [2]

(c) Hence, calculate the length of the sides of the rectangle. [2]

---

9. The diagram below shows a metal cuboid of length 18 *cm*, width 12 *cm* and height 12 *cm* with a hole of diameter 8 *cm* drilled through it.



Using $\pi = 3.14$ where necessary, calculate the volume of metal

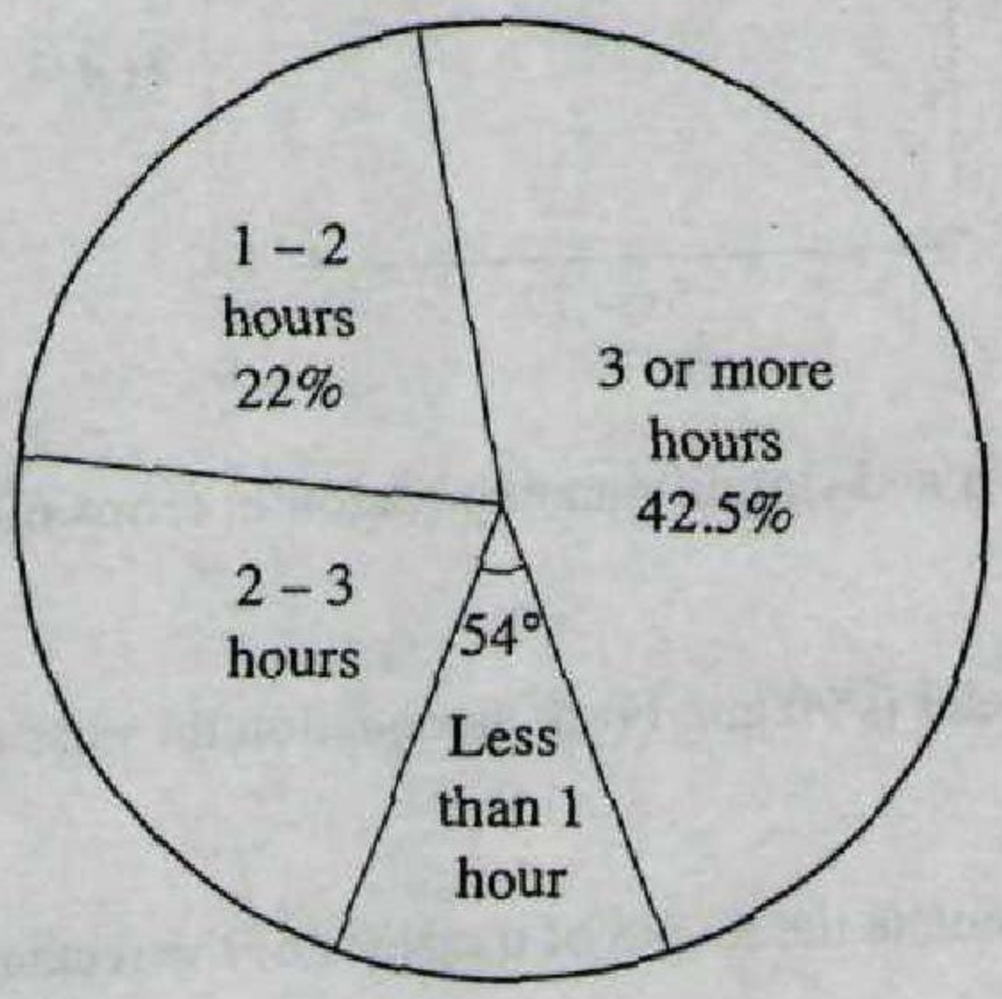
(a) before drilling, [2]

(b) removed by drilling [3]

(c) in the final product. [2]

---

10. The circle graph shows the results of a survey on daily internet use at ***Highbury High***.
A total of 1200 students were interviewed.



Calculate

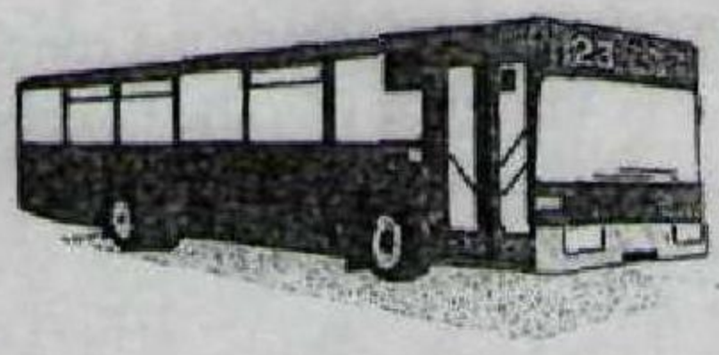
(a) the number of students who use the internet 1 – 2 hours daily, [2]

(b) the degrees of the sector representing 42.5 % of the students, [2]

(c) the percentage of the students who use the internet less than 1 hour daily, [2]

(d) the percentage of students who use the internet 2 – 3 hours daily. [2]

11.



Going home from school, Terry takes a bus journey of 9 km travelling at an average speed of 36 km/h.

(a) Calculate the time taken, in minutes, for the bus journey. [2]

He then walks the remaining 2 km to his home in 20 minutes.

(b) Calculate his average walking speed in km/h. [3]

(c) Calculate Terry's average speed for the entire journey from school to his home. [3]

---

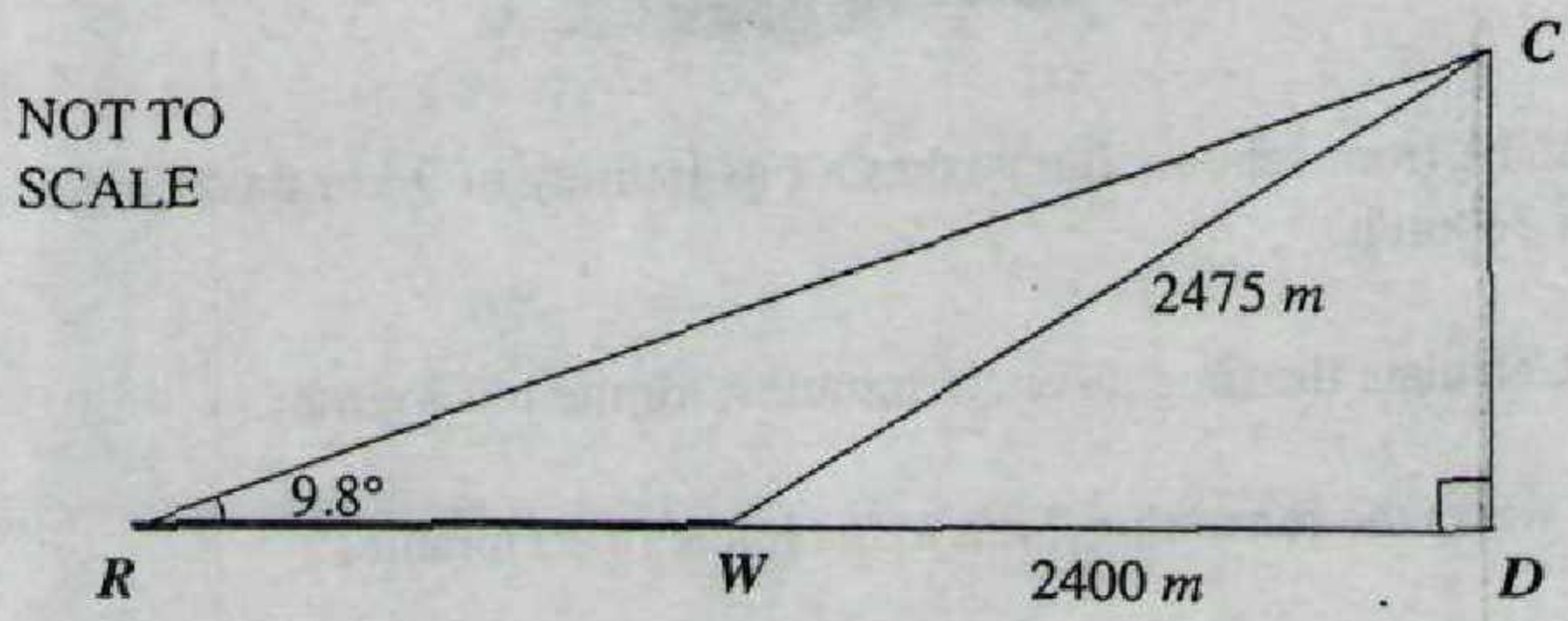
12. (a) Factorize completely $18a^3b - 12ab^2$ [3]

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

(ii) $3(2x - 5) - 7(5 - 3x)$ [3]

---

13. The diagram shows an aircraft C approaching the runway RW.
Presently the aircraft C is 2475 m from W. The horizontal distance DW is 2400 m.



(a) Calculate, giving your answer to the nearest whole number,

(i) the present altitude CD of the aircraft, [3]

(ii) the angle, $\angle CWD$. [3]

The angle, $\angle CRD$ is 9.8°.

(b) Calculate the length of the runway, RW. [4]

---

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

(a) Copy and complete the following table for the graph of $y = x^2 - 4x$.

x	–2	–1	0	1	2	3	4	5	6
y	12	5	0	–3	–4	–3	0	5	12

[2]

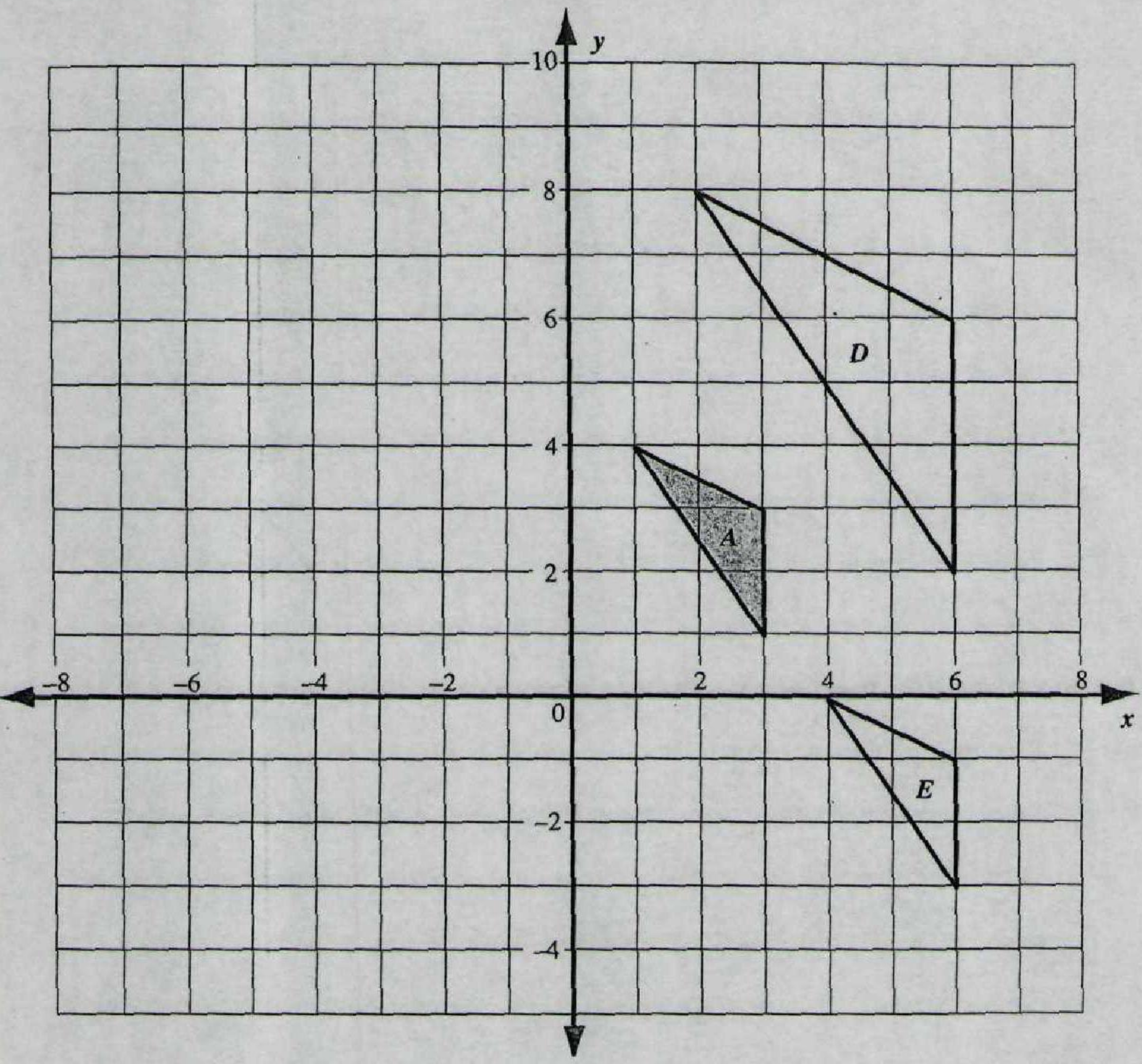
(b) Using a scale of 1 cm to 1 unit on both axes for $-3 \le x \le 7$ and $-6 \le y \le 14$ draw the graph of $y = x^2 - 4x$. [4]

(c) On the same axes draw the graph of $y = 4 - x$ [2]

(d) Write down the points of intersection of $y = x^2 - 4x$ and $y = 4 - x$. [2]

(e) Draw and write down the equation of the line of symmetry of $y = x^2 - 4x$. [2]

15.



(a) Copy the axes and draw on A (shaded). [1]

(b) Reflect ΔA in the y-axis. Label the reflection B. [2]

(c) Rotate ΔA 180° about the origin. Label the rotation C. [3]

(d) Describe completely, the single transformation that maps

(i) ΔA on to ΔD. [3]

(ii) ΔA on to ΔE. [2]

3815/3 BGCSE

MATHEMATICS

PAPER 3 (EXTENDED) 3815/3

Tuesday 26 MAY 2009 9.00 – 11.30 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.

Write your school number, candidate number, Surname and Initials in the spaces provided on each 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.]

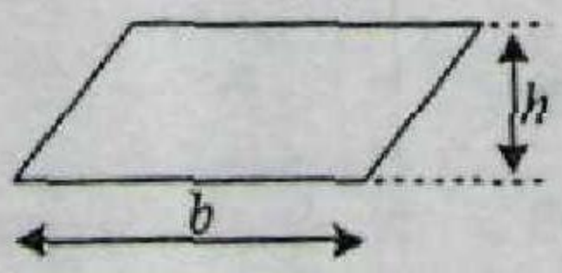
Geometrical instruments are required.

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

The total number of marks for this paper is 100.

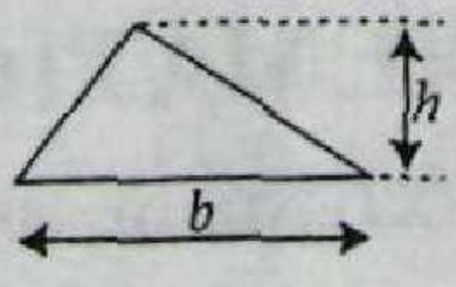
MENSURATION

Parallelogram



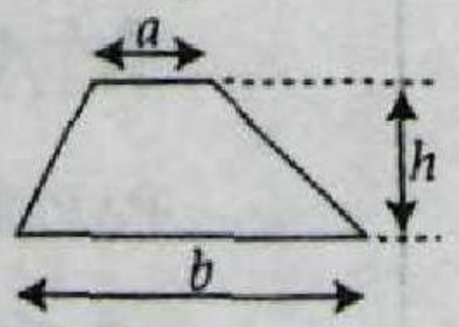
Area = bh

Triangle



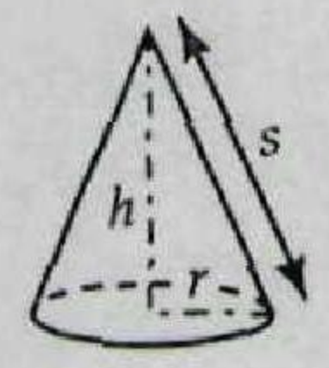
Area = $\frac{1}{2}bh$

Trapezium



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

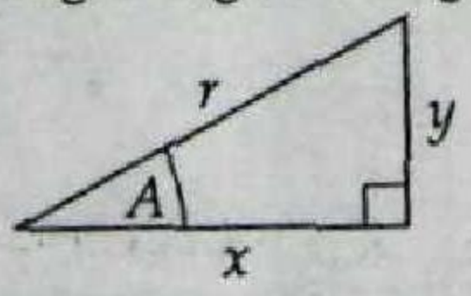
Cone



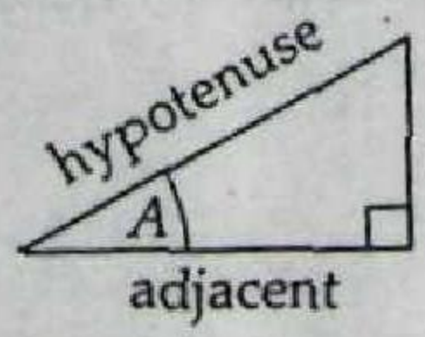
Circle (radius r, diameter d)	Circumference	$= 2\pi r$ or πd
	Area	$= \pi r^2$
Cylinder (radius r, height h)	Volume	$= \pi r^2 h$
	Area of curved surface	$= 2\pi rh$
Sphere (radius r)	Volume	$= \frac{4}{3}\pi r^3$
	Area of surface	$= 4\pi r^2$
Prism	Volume	= area of cross-section × length
Pyramid	Volume	$= \frac{1}{3}\times$ area of base × height
Cone (radius r, height h)	Volume	$= \frac{1}{3}\pi r^2 h$
	Area of curved surface	$= \pi rs$ where s = slant height $\sqrt{h^2 + r^2}$

TRIGONOMETRY

Right-angled triangle

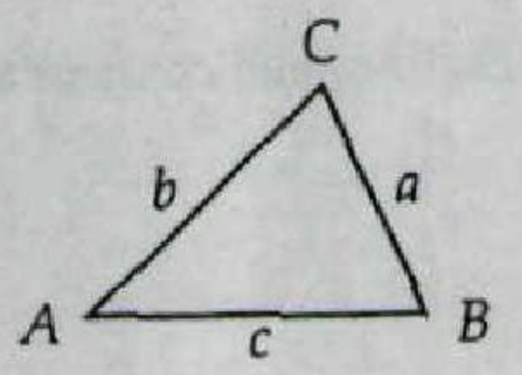


$r^2 = x^2 + y^2$ (result of Pythagoras)



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

Any triangle



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

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

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

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

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

ALGEBRA — 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 $\dfrac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

1. When 4,140 people attend a concert, the concert hall is 90% full. Calculate the maximum number of people needed to fill the hall. [2]

---

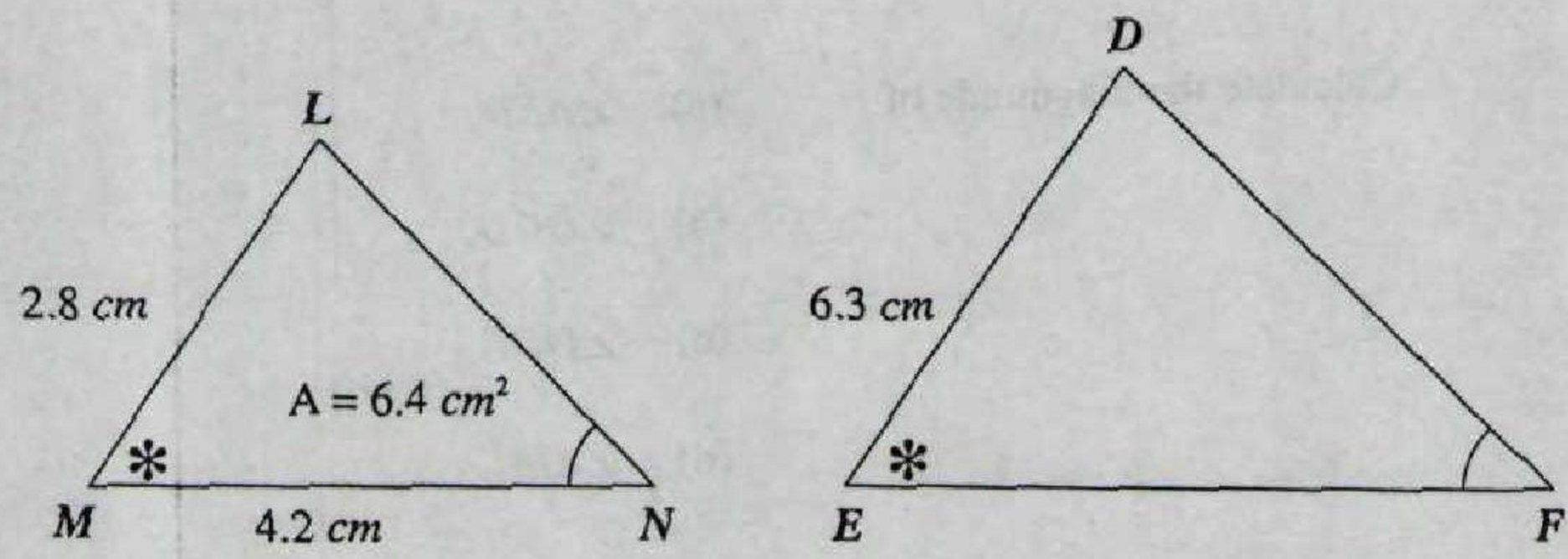
2. Simplify

$$\left(125y^9\right)^{\frac{2}{3}}$$

[2]

---

3. The triangles ΔLMN and ΔDEF are similar. In ΔLMN, $LM = 2.8\ cm$ and $MN = 4.2\ cm$. In ΔDEF, $DE = 6.3\ cm$. For ΔLMN, the area $A = 6.4\ cm^2$.



Calculate

(a) the length of EF, [2]

(b) the area of ΔDEF. [2]

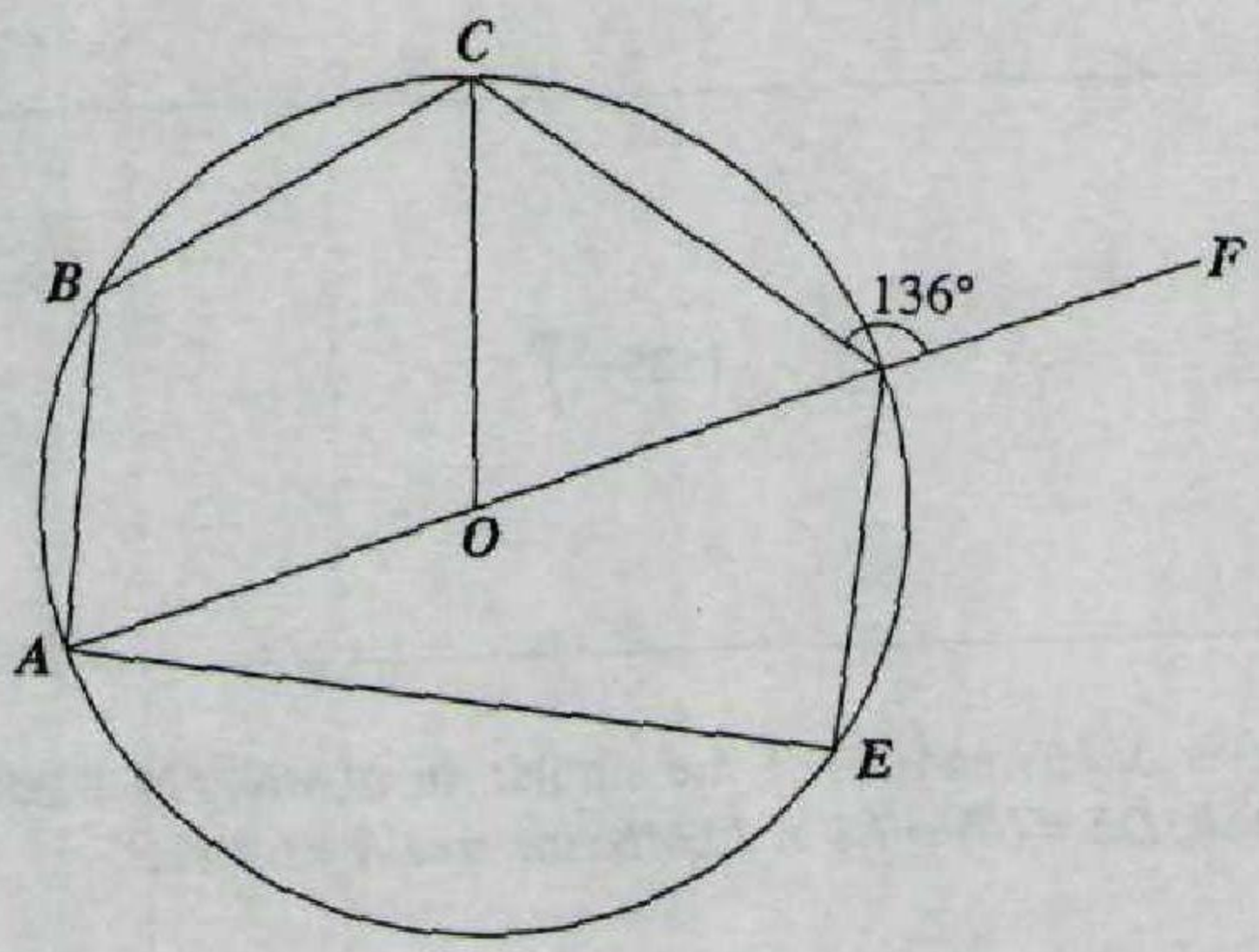
---

4. It is found that the average number of daily traffic violations (v) is inversely proportional to the number of police surveillance stops (p) on the road.
The number of traffic violations is 120 when the number of surveillance stops is 5.

Calculate the number of violations when the number of surveillance stops is increased to 8. [4]

---

5. In the diagram below, the figure $ABCDE$ is inscribed in a circle of centre O. The diameter AD is produced to F. $\angle CDF = 136°$.



NOT TO SCALE

Calculate the magnitude of

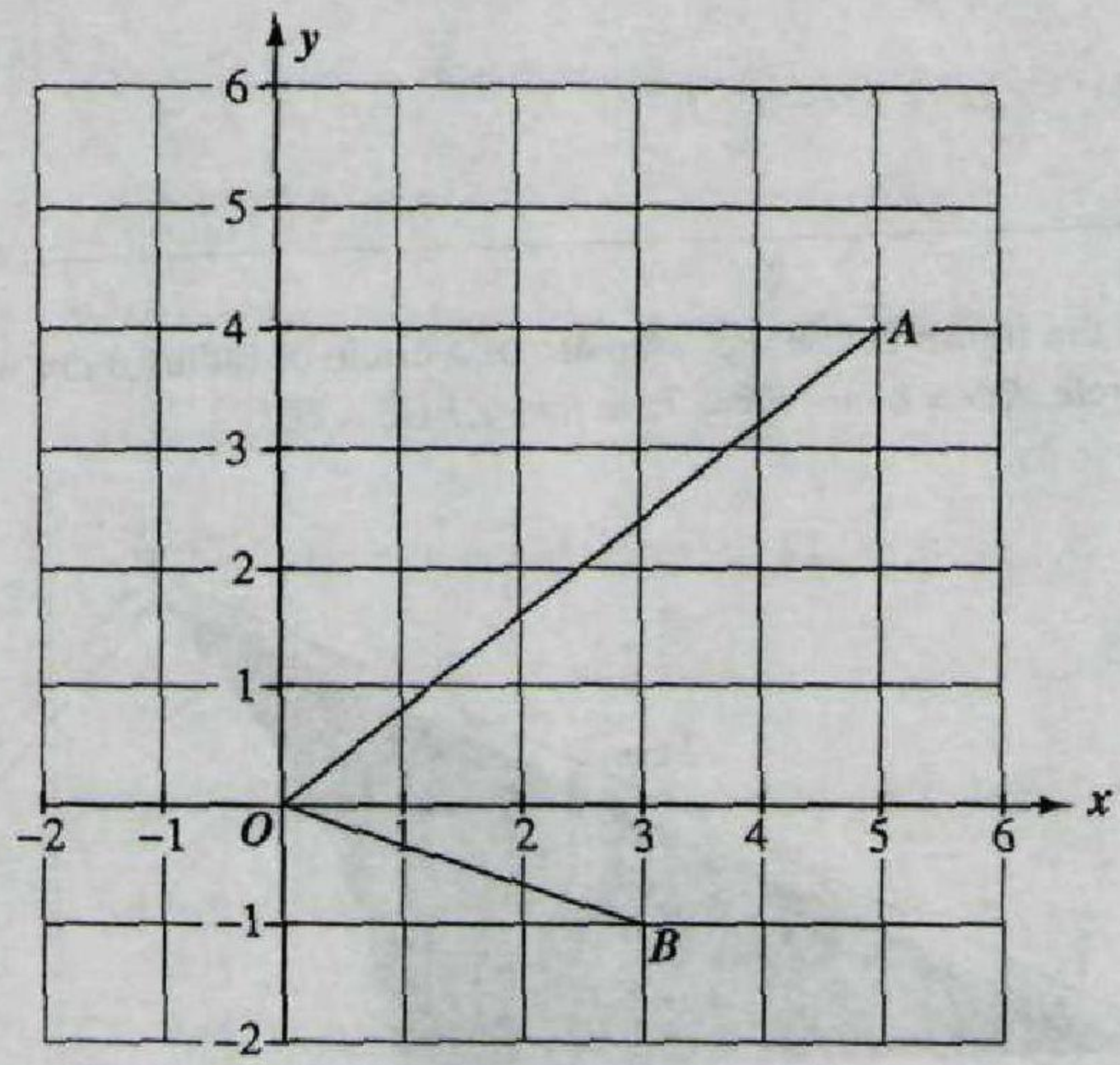
(a) $\angle AED$, [1]

(b) $\angle OCD$, [1]

(c) $\angle DOC$, [1]

(d) $\angle ABC$. [1]

6. The graph shows the position vectors $\overrightarrow{OA}$ and $\overrightarrow{OB}$.



(a) Write down the column vectors for $\overrightarrow{OA}$ and $\overrightarrow{OB}$. [2]

(b) Express $\overrightarrow{AB}$ as a column vector. [2]

(c) Calculate $\left|\overrightarrow{AB}\right|$, the magnitude of $\overrightarrow{AB}$. [2]

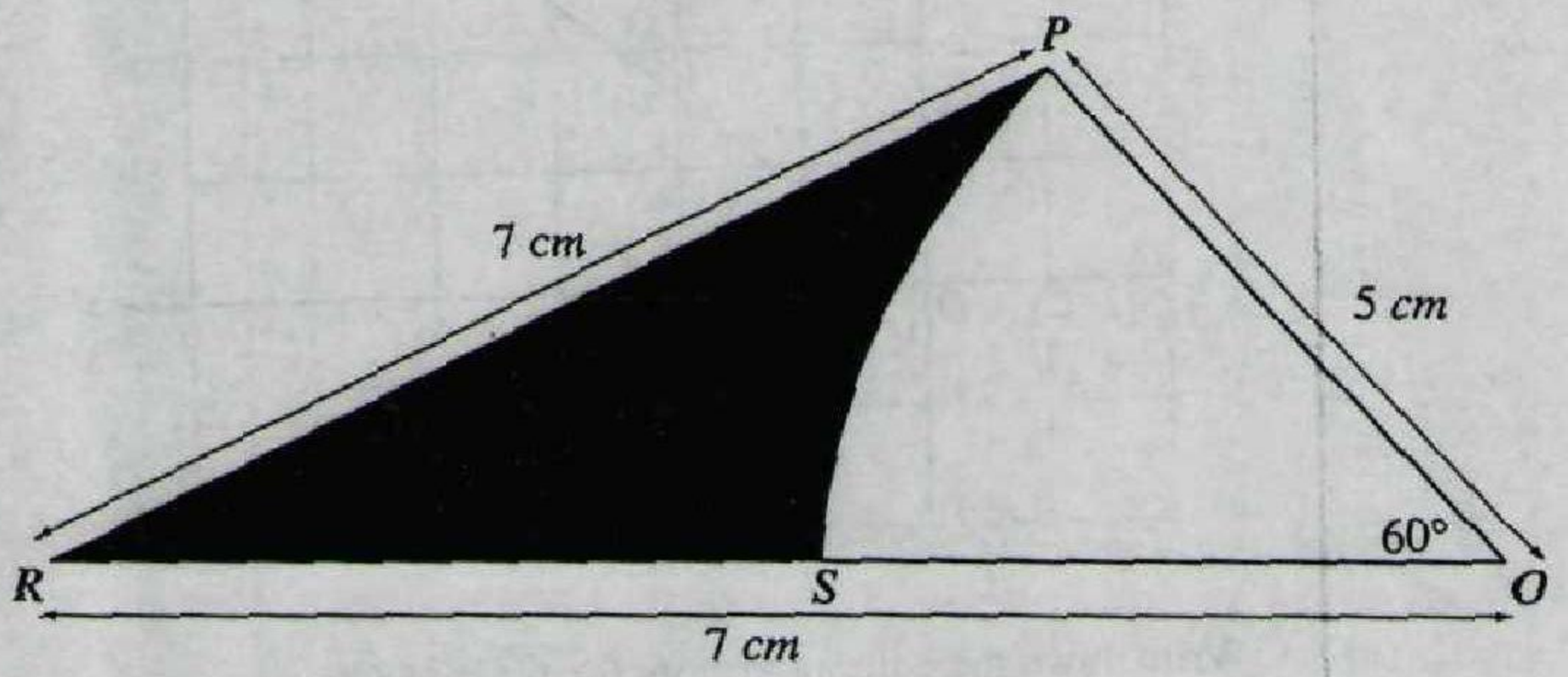
7. Solve the quadratic equations.

(a) $x^2 - 9 = 0$ [2]

(b) $2x^2 + 13x - 7 = 0$ [5]

---

8. In the figure below, PS is an arc of a circle of radius 5 cm with O as the centre of the circle. $RO = 8\ cm$, $PR = 7\ cm$ and $\angle POS = 60°$.



Using $\pi = 3.142$, calculate the area of

(a) the sector OPS, [3]

(b) the triangle OPR [3]

(c) the shaded region PRS. [1]

---

9. Given that $f(x) = 5x - 7$ and $g(x) = \frac{3+x}{2}$, calculate

(a) the value of $f(3)$, [1]

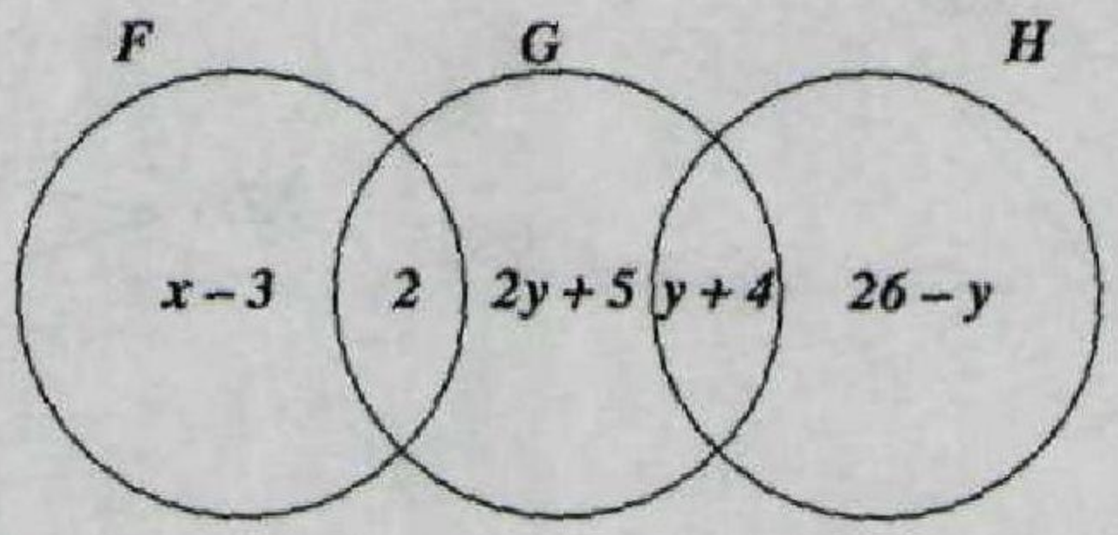
(b) x where $g(x) = 7$, [2]

(c) a simplified expression for $gf(x)$, [2]

(d) $f^{-1}(x)$. [2]

---

10. A survey was done on a group of tourists that had visited at least one of the countries, France (F), Germany (G), and Holland (H).
In the Venn diagram, the expressions represent the number of tourists in each subset.



(a) Write down the number of tourists that had visited Holland. [2]

There were 50 tourists interviewed in total.

(b) Write down an expression for x in terms of y as simply as possible. [3]

The number of tourists who had only visited Holland was 6 more than the number who had only visited Germany.

(c) Write down an equation in terms of y, and solve it. [2]

(d) Calculate the number of tourists who had visited France. [2]

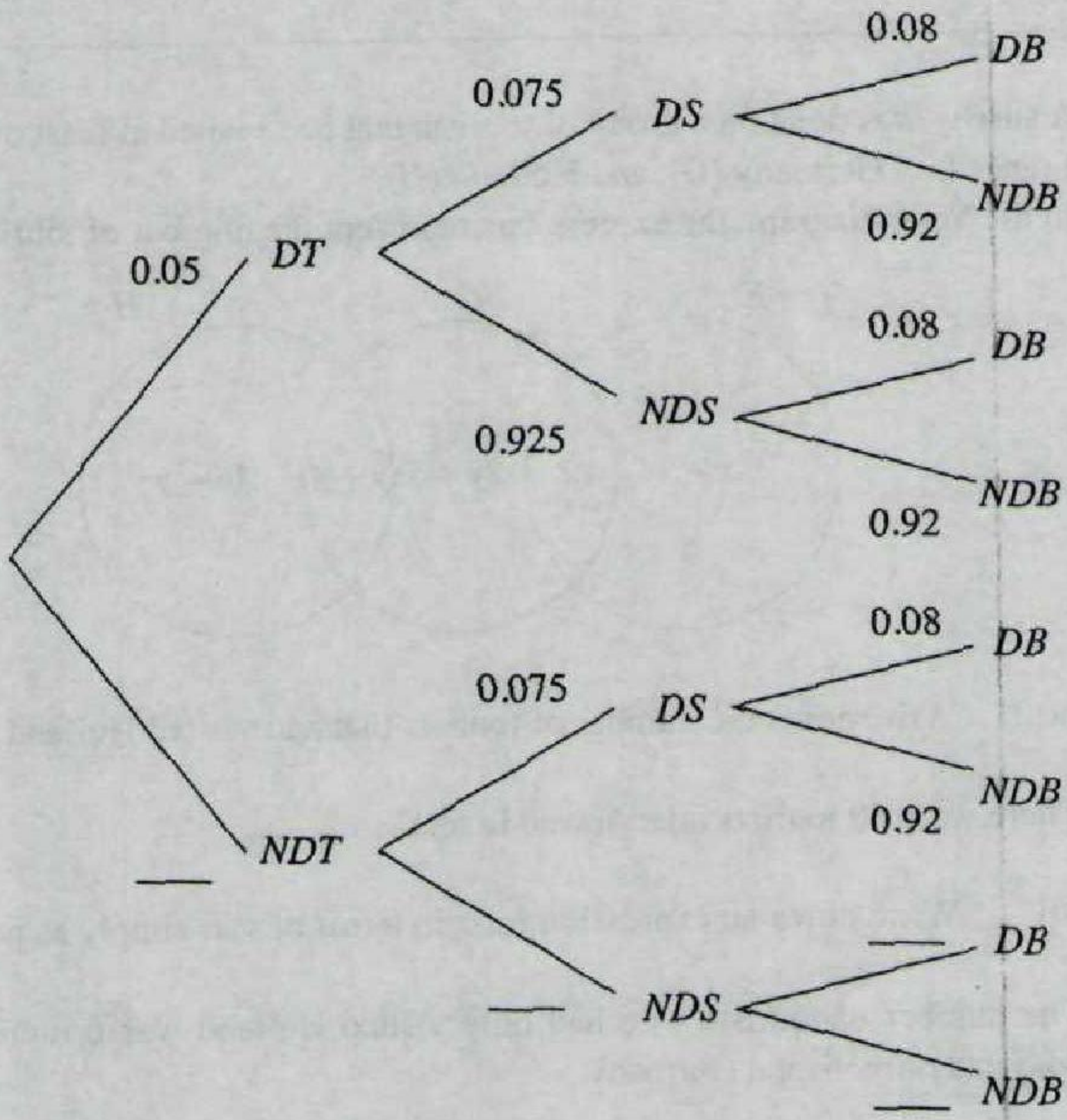
---

11. In a road safety inspection it was found that the probability that a car has defective steering (DS) is 0.075.

(a) In a sample space of 1 000 cars, calculate the expected number of cars with defective steering. [2]

It was also found that the probability that a car has defective tyres (DT) is 0.05 and that it has defective brakes (DB) is 0.08. This information is demonstrated in the partially completed tree diagram below.

(b) Copy and complete the tree diagram. [2]



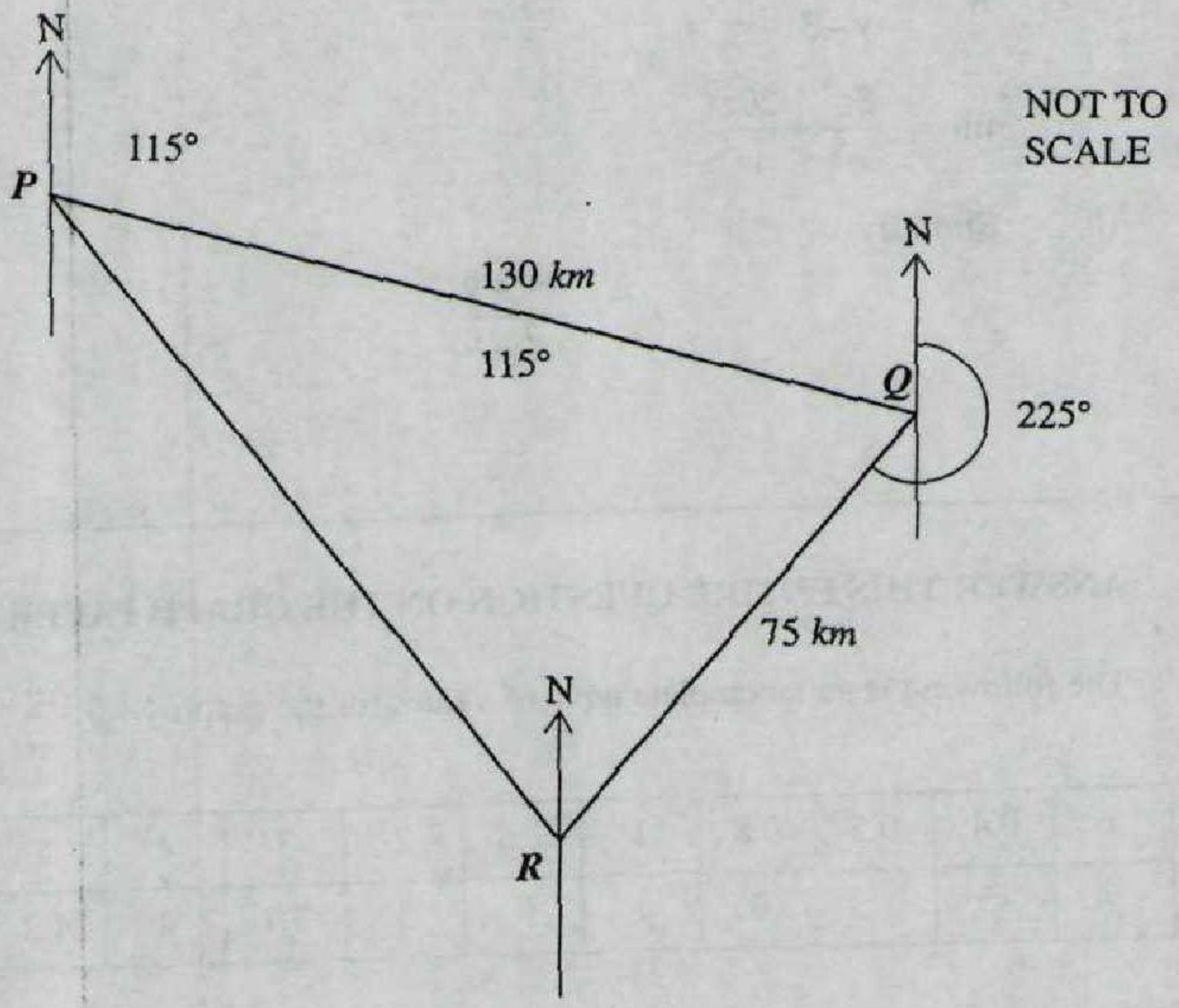
(c) Calculate the probability that a car chosen at random

(i) has defective brakes only, [2]

(ii) has two defects, [3]

(ii) has at least one defect, [3]

12. The diagram shows the location of airports P, Q and R. Airport Q is 130 km from Airport P on a bearing of 115°. Airport R is 75 km from Airport Q on a bearing of 225°.



Calculate (a) $\angle PQR$, [2]

(b) the distance from Airport R to Airport P, giving your answer to the nearest whole number, [4]

(c) $\angle RPQ$, [4]

(d) the bearing of Airport P from Airport R. [2]

13. (a) Write as a single fraction in simplest form.

i. $\frac{x+2}{4}+\frac{x}{3}$ [3]

ii. $\frac{4}{y-3}-\frac{3}{y}$ [3]

iii. $\frac{8z^3}{w^2}\div\frac{20z^3}{w^4}$ [3]

(b) Simplify

$$\frac{3m+9}{m^2-9}$$

[3]

---

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

The following is an incomplete table of values for the graph $y+5-\frac{4}{x}$.

x	0.4	0.5	0.8	1	1.6	2	3	4	5	6
y	–5		0	1		3	3.7	4	4.2	4.3

(a) Copy and complete the table of values. [2]

(b) Using a scale of 2 cm to 1 unit on each axis for $0 \le x \le 7$ and $-5 \le y \le 5$, draw the graph of $y = 5-\frac{4}{x}$. [4]

(c) Using the same scale and axes, draw the graph of $y = x - 1$. [2]

(d) From your graph, estimate the two values of x where the curve and the line intersect. [2]

(e) Shade the region for which and $y \ge x - 1$ and $y \le 5 - \frac{4}{x}$. [2]

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