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MATHEMATICS**PAPER 1 (CORE/EXTENDED) 3815/1****Wednesday 21 MAY 2008 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.

ALL constructions and drawings should be done with a pencil.

INFORMATION FOR CANDIDATES

Calculators [NOT GRAPHING CALCULATORS] may be used.

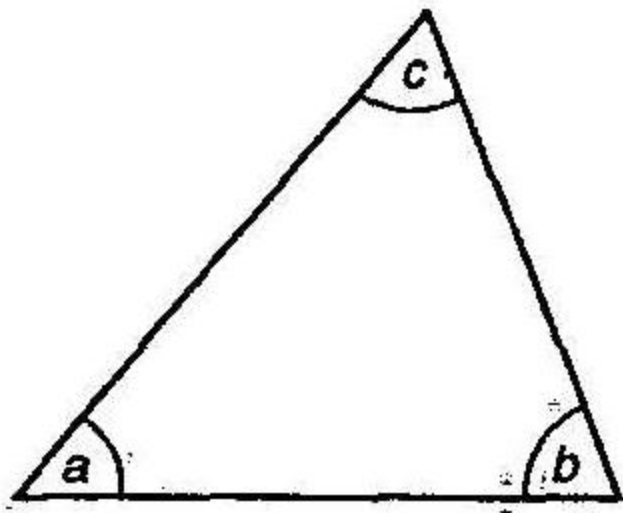
Geometrical instruments are required.

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

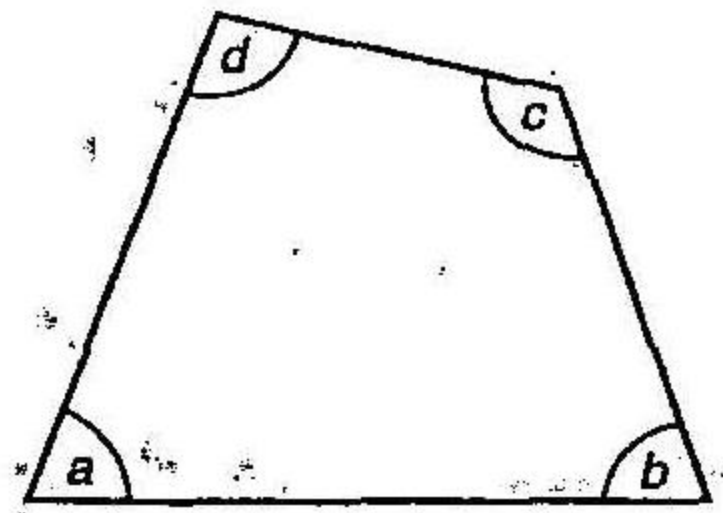
The total number of marks for this paper is 100.

This question paper consists of 16 printed pages and 4 blank pages.

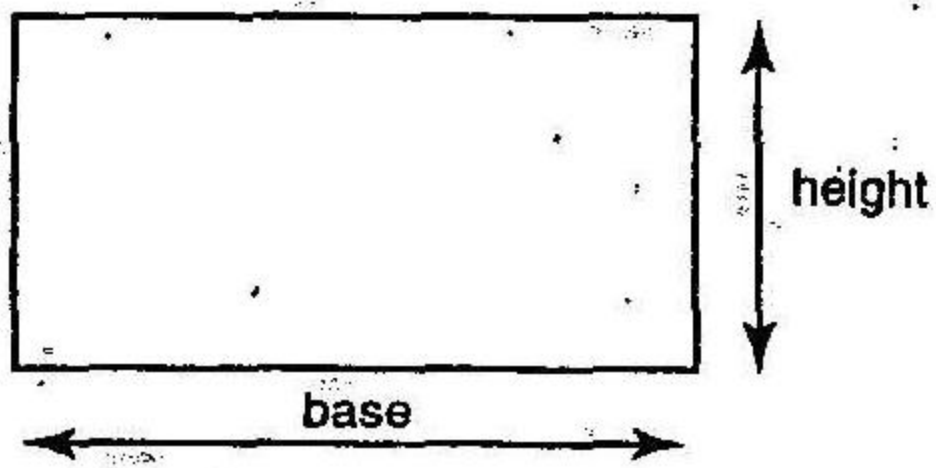
INFORMATION AND FORMULAE



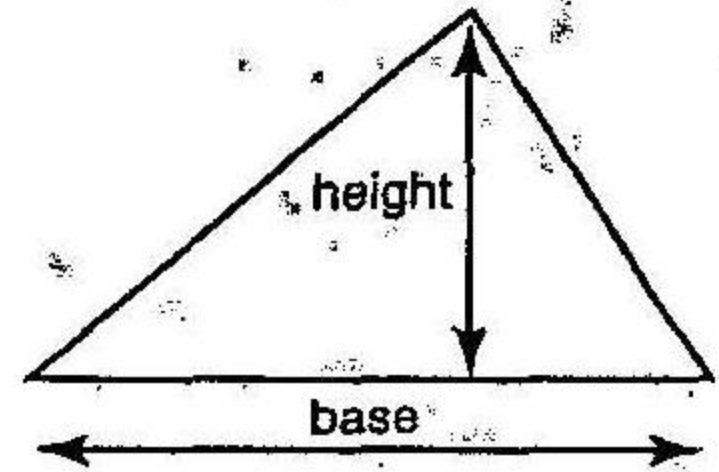
Angle sum of triangle
 $a + b + c = 180^\circ$



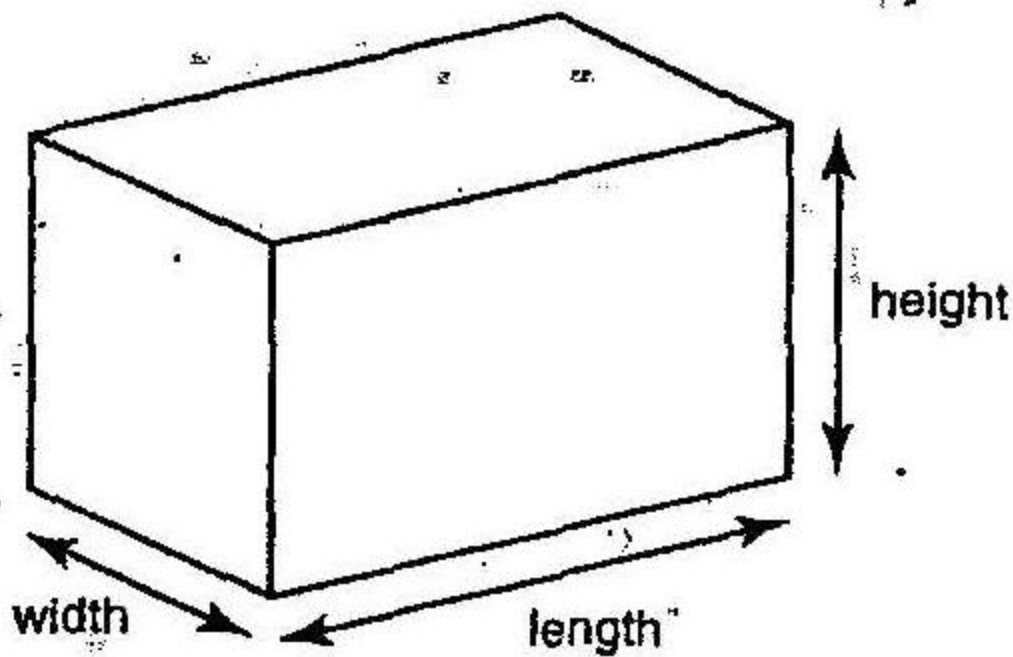
Angle sum of quadrilateral
 $a + b + c + d = 360^\circ$



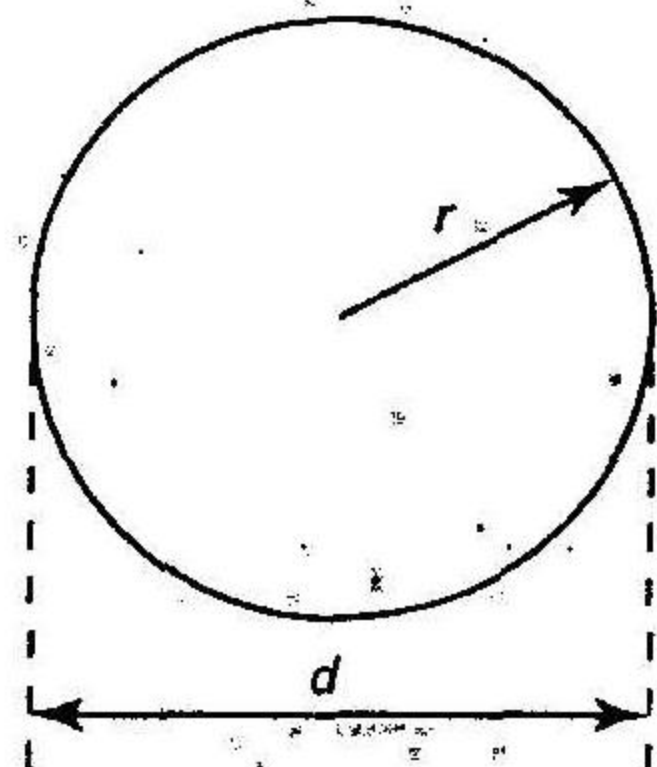
Area of rectangle = base $\times$ height



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



Volume of cuboid = length $\times$ width $\times$ height



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

1. Write down the next number in each sequence

(a) 2, 6, 10, _____

[1]

(b) 19, 16, 13, _____

[1]

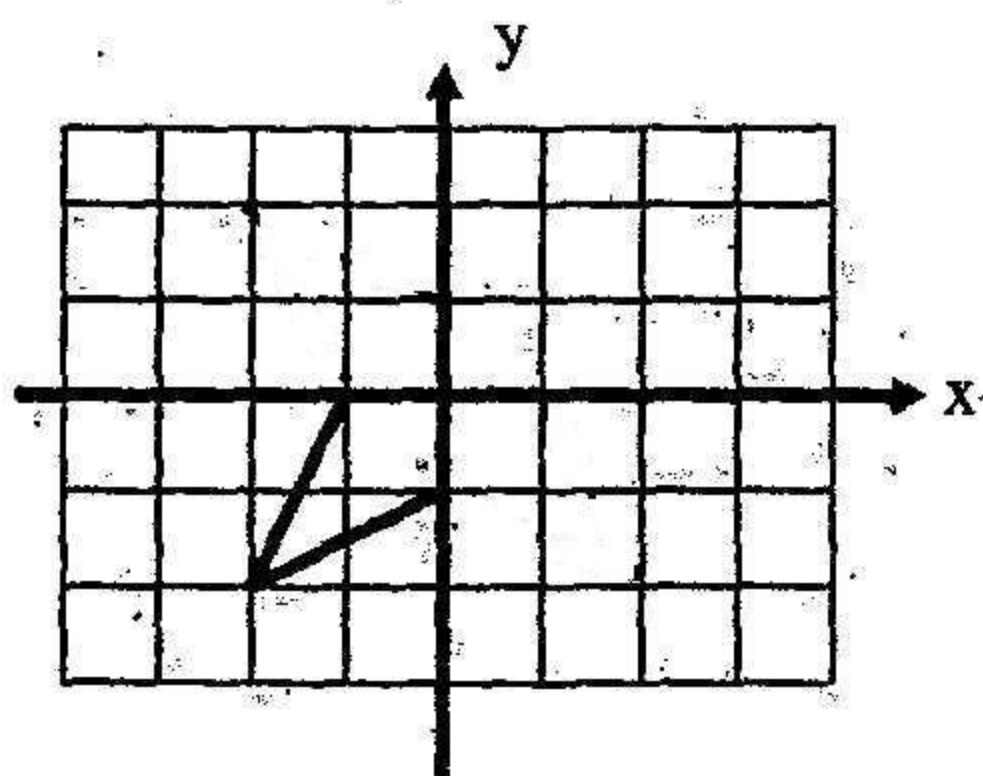
2.



David is a packing boy at the local store. At the end of the day, his tips amounted to nine \$1 bills, thirteen 25¢ coins and eight 10¢ coins. Calculate the total amount of his tips.

Answer _____ [3]

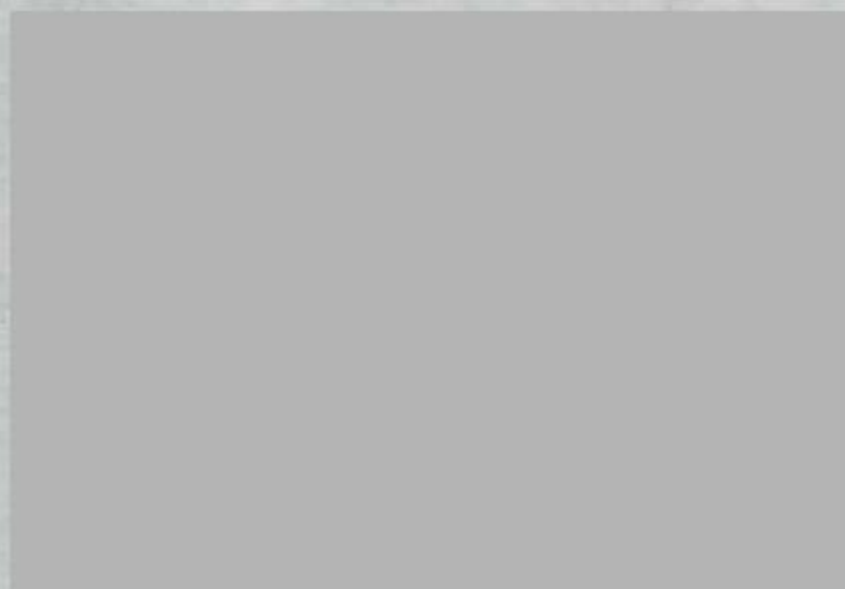
3. Complete the diagram so that it is symmetrical about both the x – axis and y – axis.

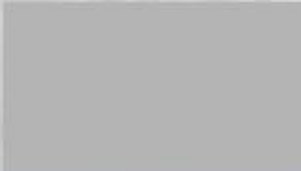


[3]

4. Simplify

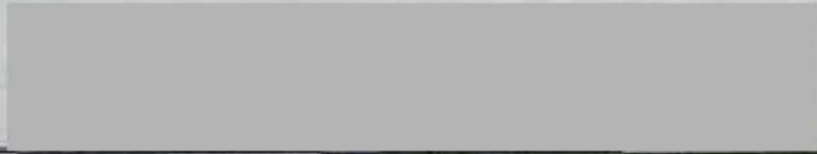
$$\sqrt{36} + 4 \times 5 - 3^2$$



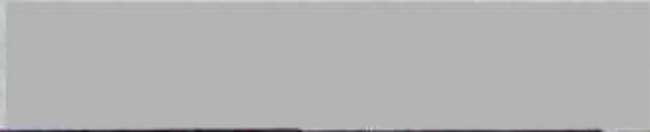
Answer  _____ [4]

5. (a) Write the value of $(12.35)^2$

(i) exactly,

Answer  _____ [1]

(ii) to two decimal places.

Answer  _____ [1]

(b) Round 6783

(i) to three significant figures,

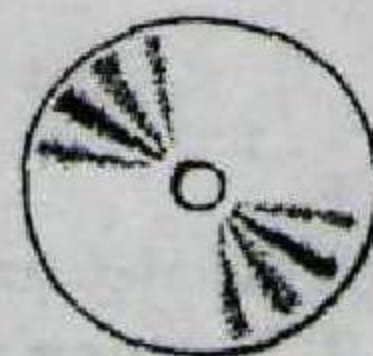
Answer  _____ [1]

(ii) to the nearest hundred.

Answer  _____ [1]

6. Jason is making a party CD. He has chosen five songs. The table lists the song titles and playing times.

Song Title	Playing Time	
	Minutes	Seconds
Party Time	4	5
Going Funky	3	20
In The Groove	3	19
Wind-Up	3	27
Once Again	4	12



Calculate

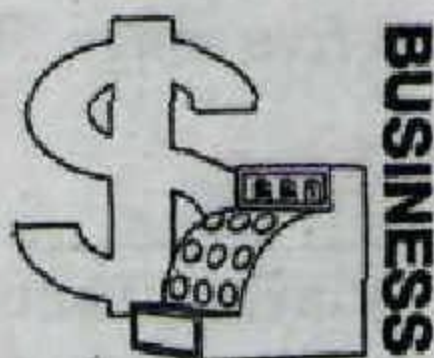
- (a) the total time for the music selected,

Answer _____ [2]

- (b) the time remaining if the CD can hold 60 minutes of music.

Answer _____ [2]

7.



Mr. Adderley and Mr. Bain are business partners. They share profits in the ratio 7 : 9. This year the total profits were \$49,600.

- (a) Calculate Mr. Bain's share.



Answer _____ [2]

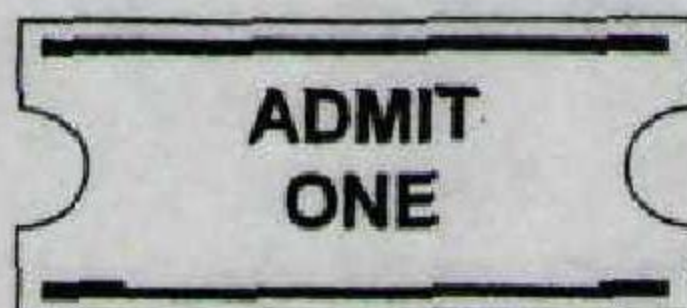
Last year Mr. Adderley received \$4,550 as his share.

- (b) Calculate the total profits for last year.



Answer _____ [2]

8.



To watch the *Summer Sports Competition*, a student ticket costs t dollars. An adult ticket costs \$5 more than a student's ticket.

Write down in terms of t

- (a) the cost of an adult ticket,

Answer _____ [1]

- (b) the total cost of tickets, in simplest form, for a family of two adults and three students.

Answer _____ [4]

9. (a) Express the decimal number 0.475

(i) as a percentage,

Answer _____ [1]

(ii) as a fraction in lowest terms.

Answer _____ [2]

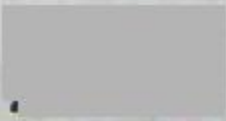
(b) An *Arts and Craft* project requires 42 pieces of wire, each of length $1\frac{4}{7}$ feet. Assuming there is no waste in cutting, calculate the minimum length of wire that should be purchased.

Answer _____ [2]

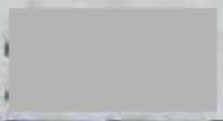
10. {20, 21, 22, 23, 24, 25, 26, 27, 28}

From the set of numbers above, write down the

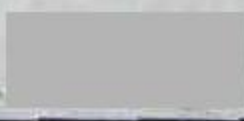
(a) multiple of 13,

Answer  _____ [1]

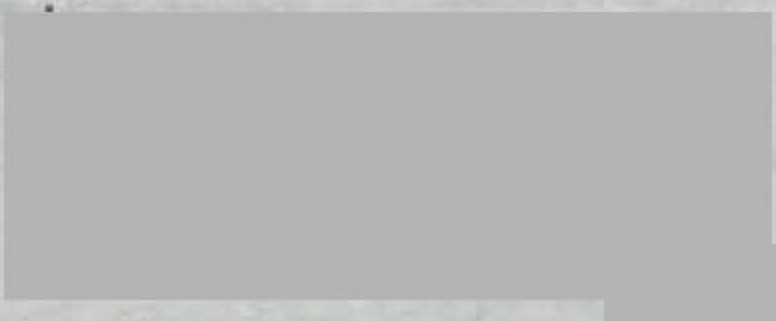
(b) factor of 81,

Answer  _____ [1]

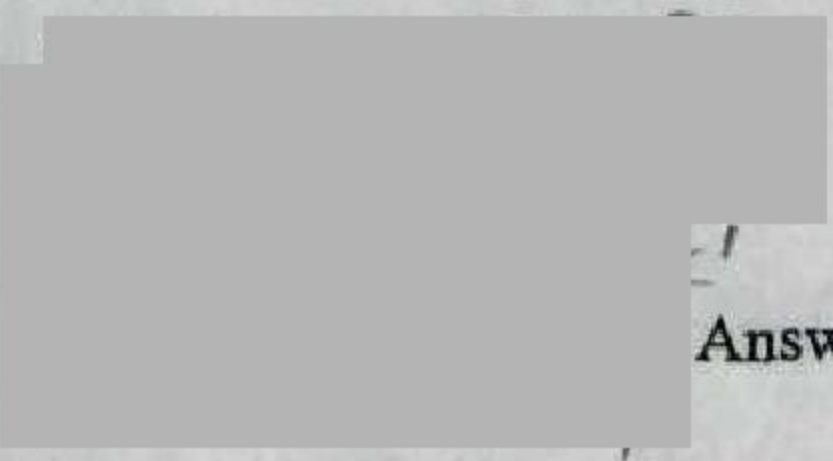
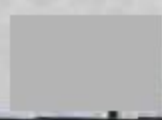
(c) prime number,

Answer  _____ [1]

(d) Lowest Common Multiple (LCM) of 4 and 14,

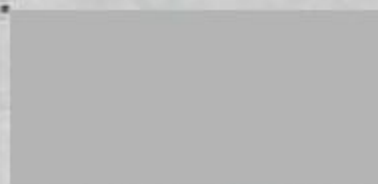

Answer  _____ [1]

(e) Highest Common Factor (HCF) of 63 and 84.


Answer  _____ [1]

11. (a) Given that $a = 7$ and $b = 0$, calculate the value of

$$a^2 - 4b.$$

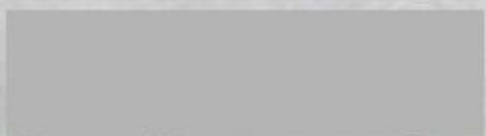


Answer  _____ [2]

- (b) Solve this equation for x

$$5(x - 2) = 3.$$



Answer  _____ [3]

13.

(i)

(ii)

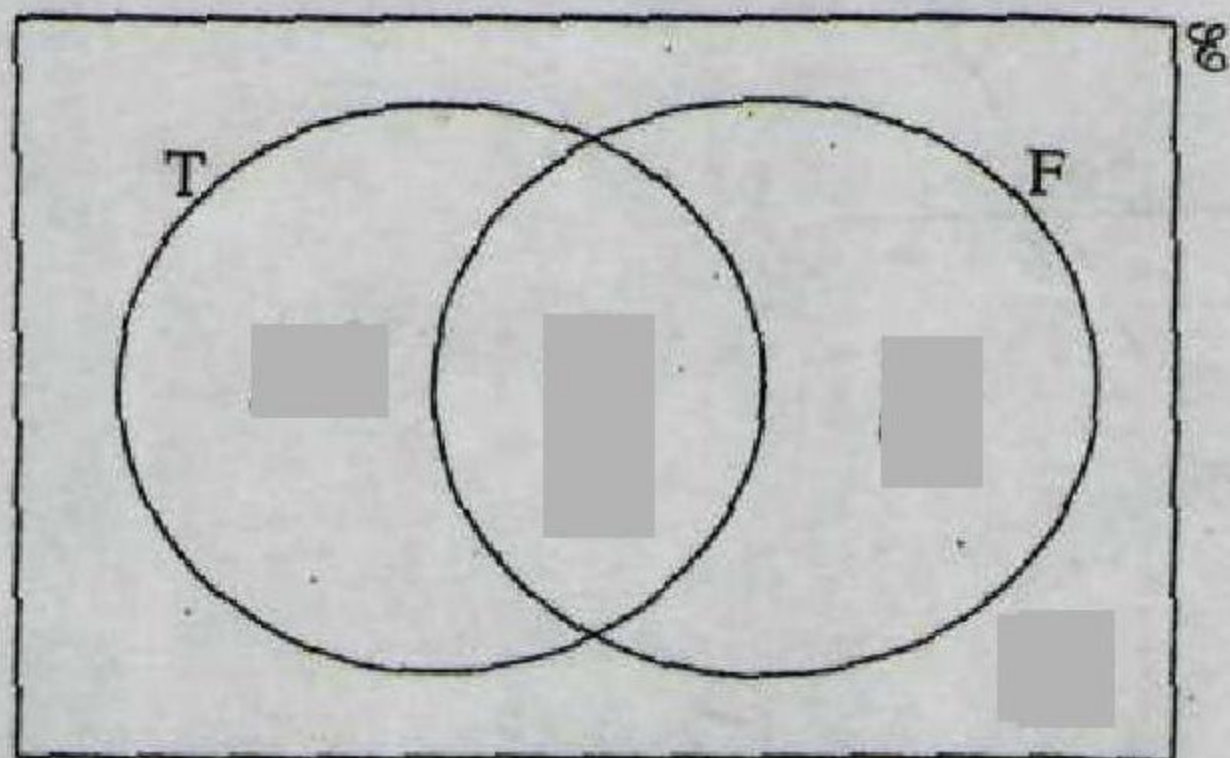
(iii)

(b)

Answer

14.

(a)



(b)

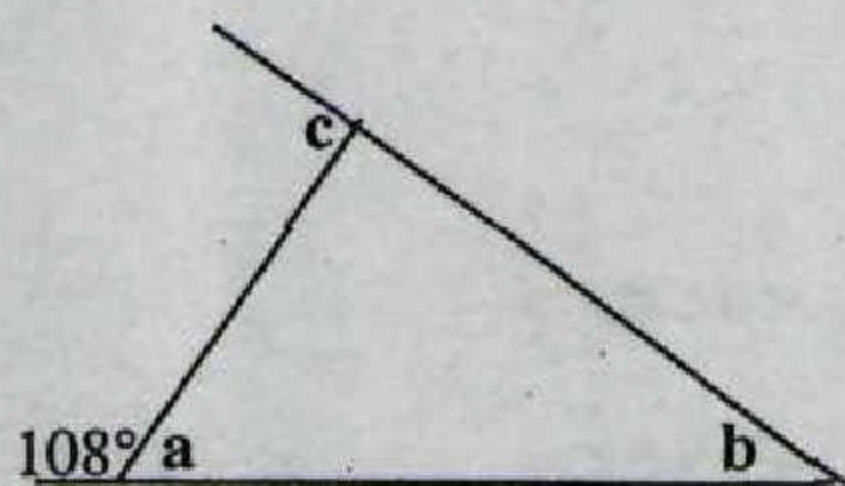
(i)

Answer

(ii)

Answer

15.



NOT TO SCALE

(a) From the diagram above, calculate the size of angle

(i) a ,

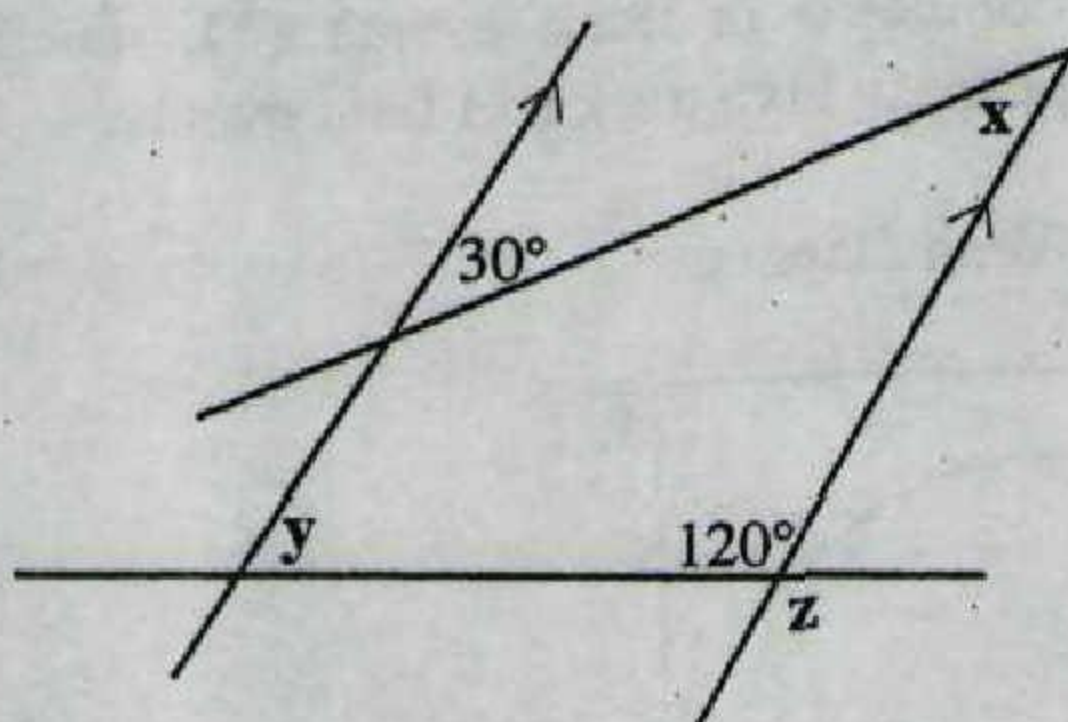
Answer [1]

(ii) b ,

Answer [1]

(iii) c .

Answer [1]



NOT TO SCALE

(b) Calculate the size of angle

(i) x ,

Answer [1]

(ii) y ,

Answer [1]

(iii) z .

Answer [1]



Mrs. Tracey works $6\frac{1}{2}$ hours per day from Monday to Wednesday and 8 hours per day on Thursday and Friday. She is paid \$8.10 per hour.

(a) Calculate

(i) the number of hours worked per week,

Answer _____ [2]

(ii) her weekly earnings.

Answer _____ [2]

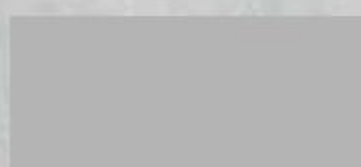
She receives an increase in pay, and her new weekly earnings are \$301.75 for the same number of hours.

(b) Calculate her new hourly rate.

Answer _____ [2]

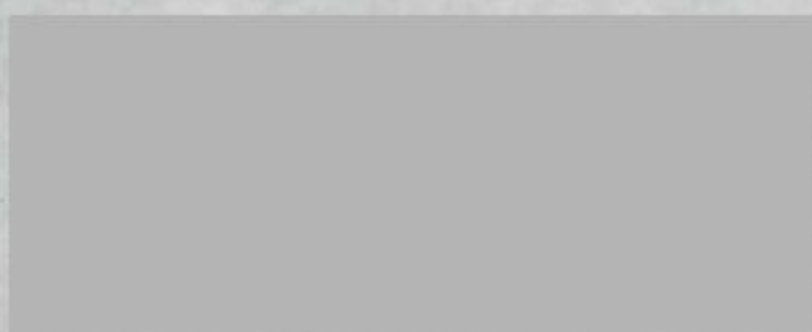
17. Simplify

(a) $6\left(\frac{1}{3} - x\right),$



Answer _____ [2]

(b) $19m - 8n - 5n + m,$



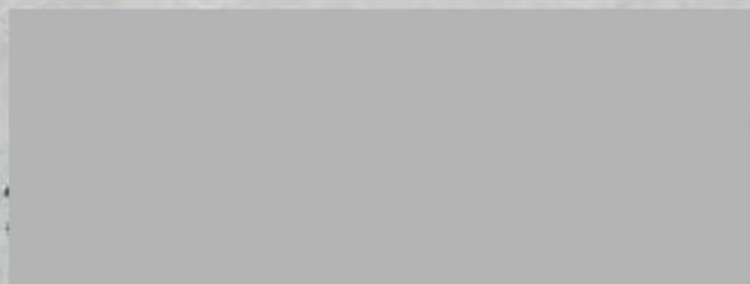
Answer _____ [2]

(c) $3a^2 \times 2 \times 5a,$



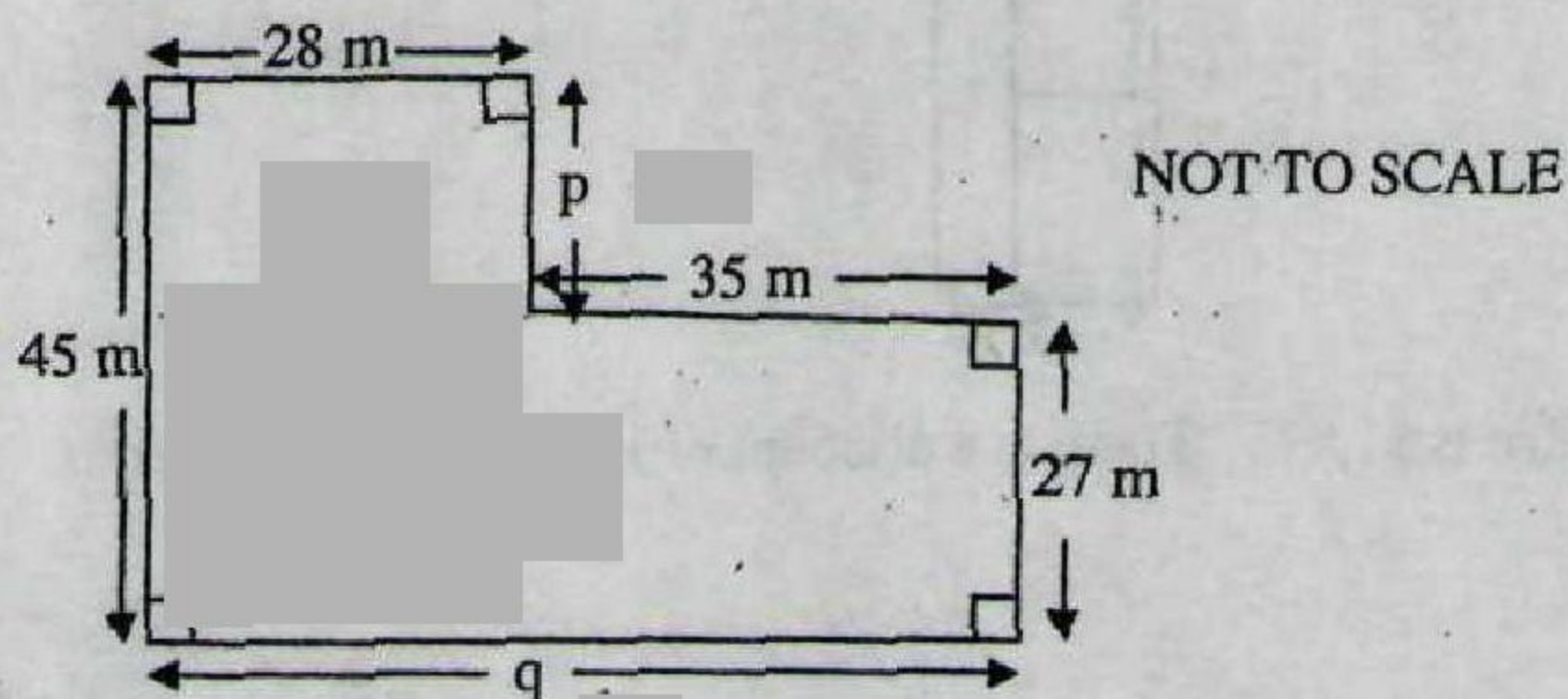
Answer _____ [2]

(d) $18x^4 + 3x.$



Answer _____ [2]

18.



The diagram above shows an L-shaped plot of land.

(a) Calculate

(i) the length of p,

Answer _____ [1]

(ii) the length of q,

Answer _____ [1]

(iii) the perimeter of the plot of land,

Answer _____ [2]

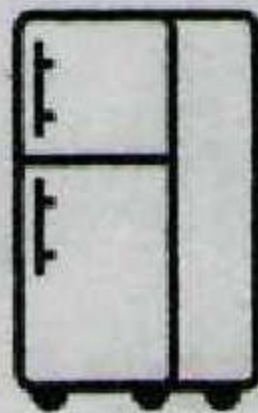
(iv) the area of the plot of land.

Answer _____ [3]

The plot of land is to be planted with banana suckers. Each banana sucker requires an area of 5 m^2 .

(b) Calculate the maximum number of banana suckers that should be planted.

Answer _____ [2]



The price of a fridge is \$1,875. There is a discount of 15% for cash payment.

(a) Calculate

(i) the amount of discount for cash payment,

Answer _____ [2]

(ii) the cash price.

Answer _____ [2]

The hire-purchase plan requires a deposit of \$395 followed by 12 monthly payments of \$146 each.

(b) Calculate

(i) the total amount of monthly payments,

Answer _____ [2]

(ii) the total hire-purchase price,

Answer _____ [2]

(iii) the amount that can be saved by paying cash.

Answer _____ [2]

MATHEMATICS**PAPER 2 (CORE/EXTENDED) 3815/2****Friday 23 MAY 2008 9.00 – 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.**

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 constructions, drawings and lines where a pencil may be used.

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 [].

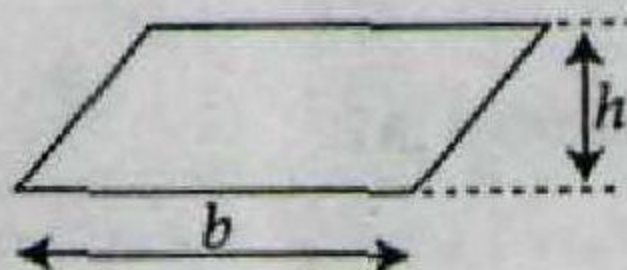
The total number of marks for this paper is 100.

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

INFORMATION AND FORMULAE

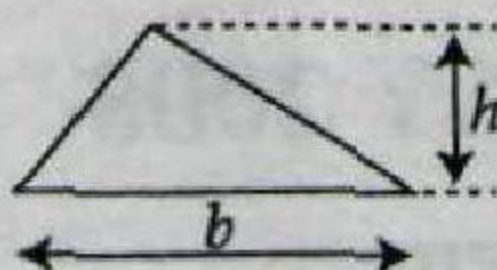
MENSURATION

Parallelogram



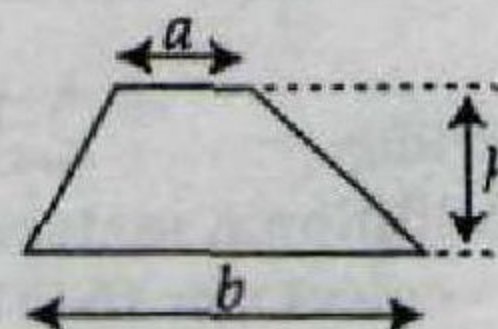
$$\text{Area} = bh$$

Triangle



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

Trapezium



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

Circle (radius r , diameter d)

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

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

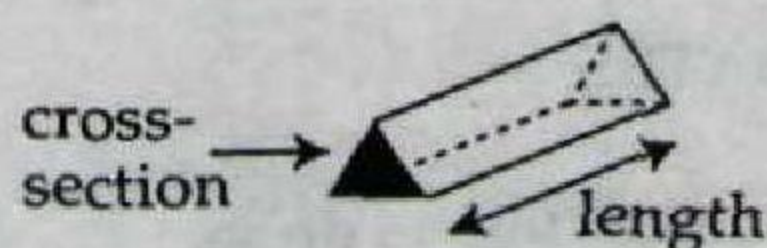
Cylinder (radius r , height h)

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

Prism

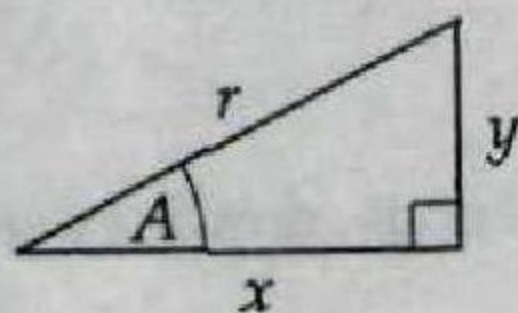
$$\text{Volume} = \text{area of cross-section} \times \text{length}$$

e.g. triangular prism

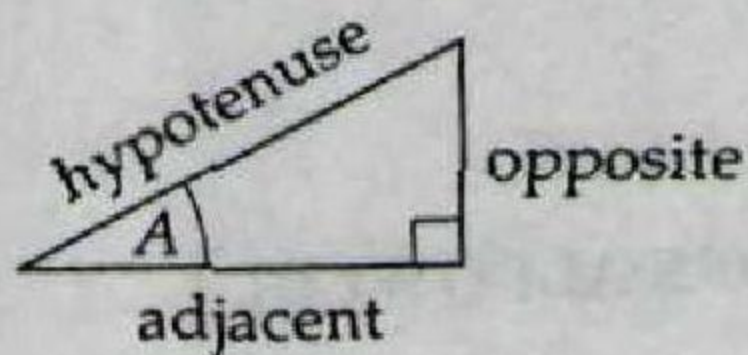


TRIGONOMETRY

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. Express this ratio in its simplest form.

75¢ : \$3

[2]

2.



Light travels at a rate of approximately 1.86×10^5 miles per second.
It takes light 5×10^2 seconds to travel from the Sun to Earth.
Calculate the approximate distance between the Sun and Earth.
(Give your answer in scientific notation / standard form).

[3]

3.



To make a tuna loaf for five servings, 250 g of canned tuna fish is needed.

Calculate

- (a) the amount of grams of tuna fish needed for 8 servings, [2]
- (b) the number of servings that can be obtained from 600 g of tuna fish. [2]
-

4. Solve this equation for b

$$\frac{2b-5}{7} = \frac{b}{3}$$

[4]

5. (a) Factorize completely

$$7m^2n - 21mn.$$

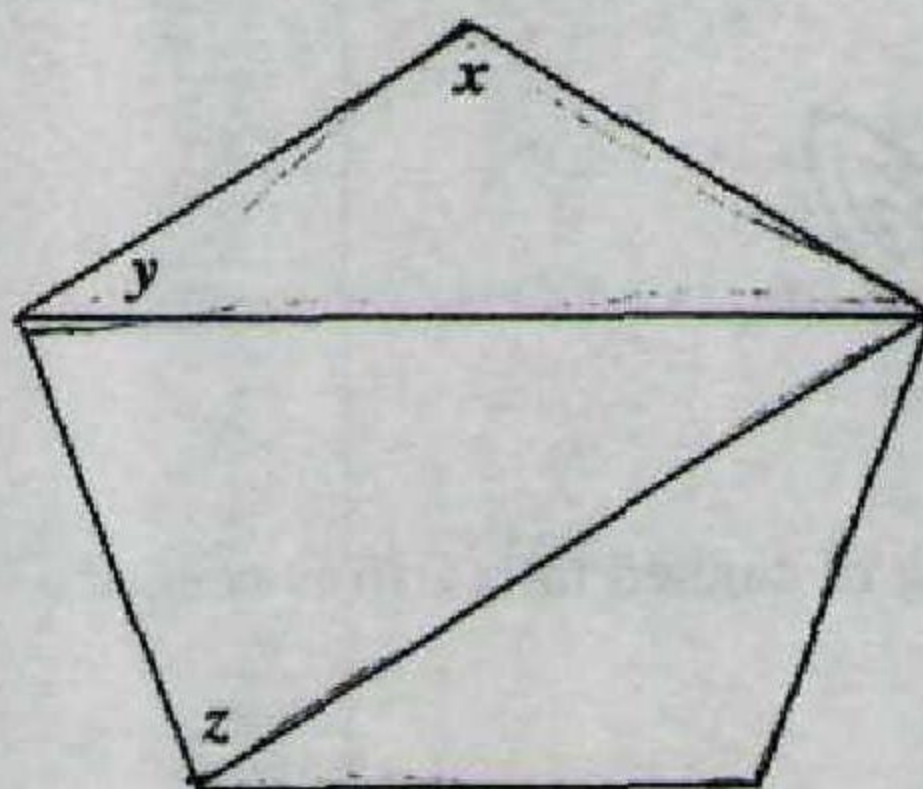
[3]

- (b) Simplify

$$3 + 2(5 - 4x) + 9x.$$

[3]

6. The polygon below is a regular pentagon.



NOT TO SCALE

Calculate the size of the angle

- (a) x ,

[2]

- (b) y ,

[2]

- (c) z .

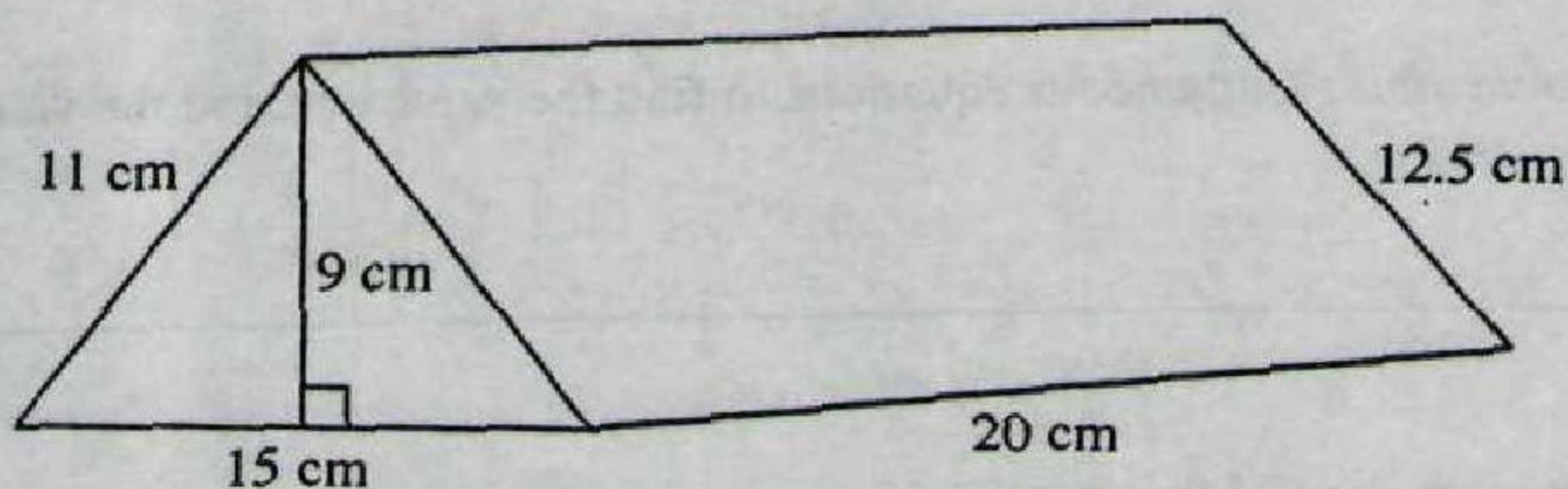
[2]

7. A formula for the area of a trapezium is:

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

- (a) Calculate A when $h = 6.3$, $a = 8.4$ and $b = 13.6$, [3]
- (b) Write b as the subject of the formula. [3]
-

8.

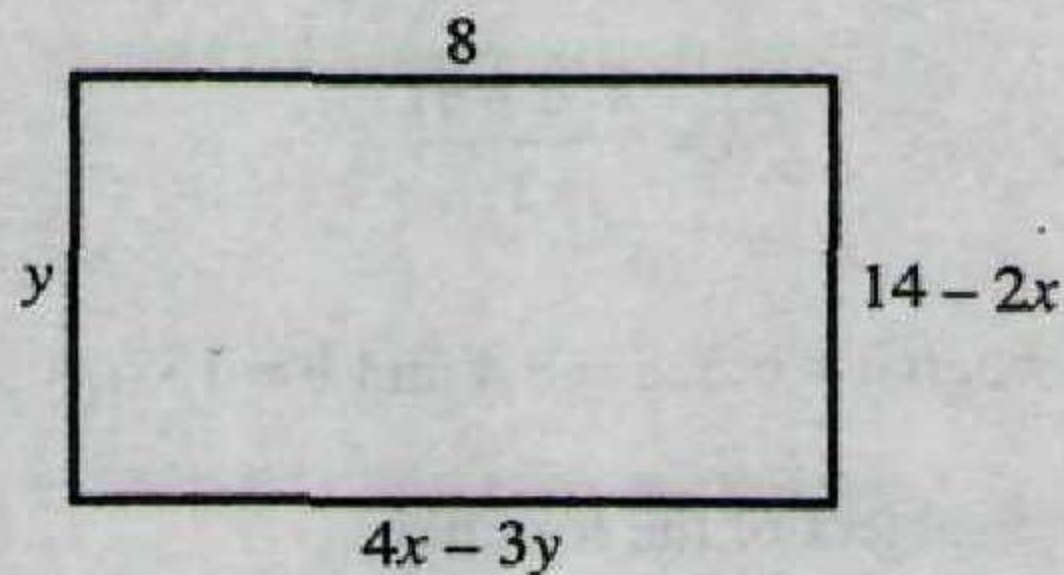


The diagram represents a triangular prism of length 20 cm. The triangular cross-section has sides of length 11 cm, 12.5 cm and 15 cm and a height of 9 cm.

Calculate

- (a) the area of the cross-section, [2]
- (b) the volume of the prism, [2]
- (c) the total surface area of the prism. [3]
-

9. A rectangle has dimensions given in terms of x and y as shown.



- (a) Write down a pair of simultaneous equations for the width and the length of the above rectangle. [2]
- (b) Solve your simultaneous equations to find the value of x and the value of y . [5]
-

10. In the first eight days of the month of June, the rainfall was

17 mm, 8 mm, 0 mm, 13 mm, 8 mm, 10 mm, 17 mm, 8 mm

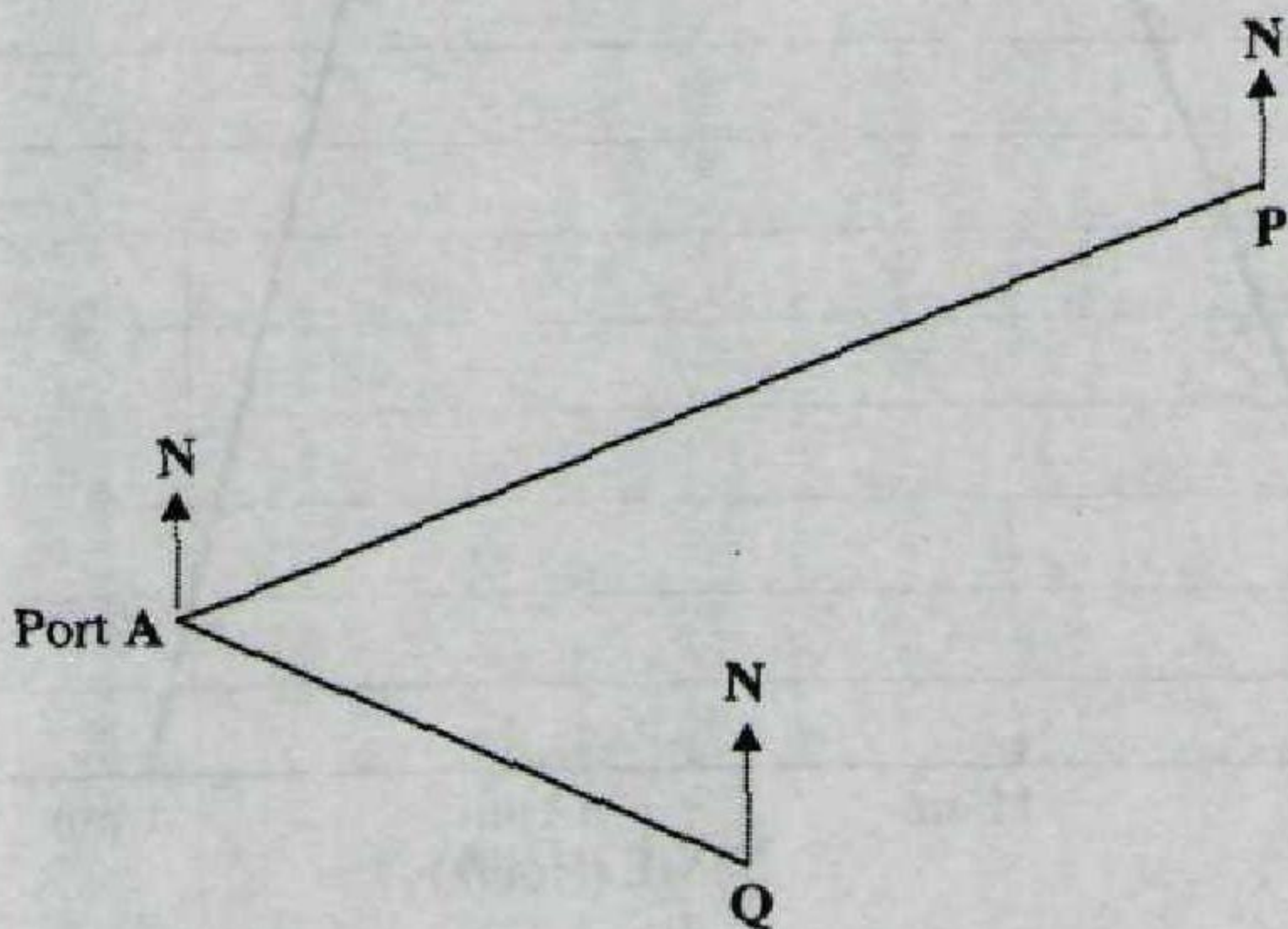
- (a) Write down the modal rainfall for the first eight days of the month. [1]
- (b) Calculate
- (i) the mean daily rainfall for the first eight days of June, [2]
- (ii) the median. [2]

It did not rain on any of the other days of the month.

- (c) Calculate the mean daily rainfall for the entire month of June. [2]
-

11. The diagram is a **scale drawing** of two fishing boats **P** and **Q** offshore from Port **A**.

Scale: 1 cm represents 5 km

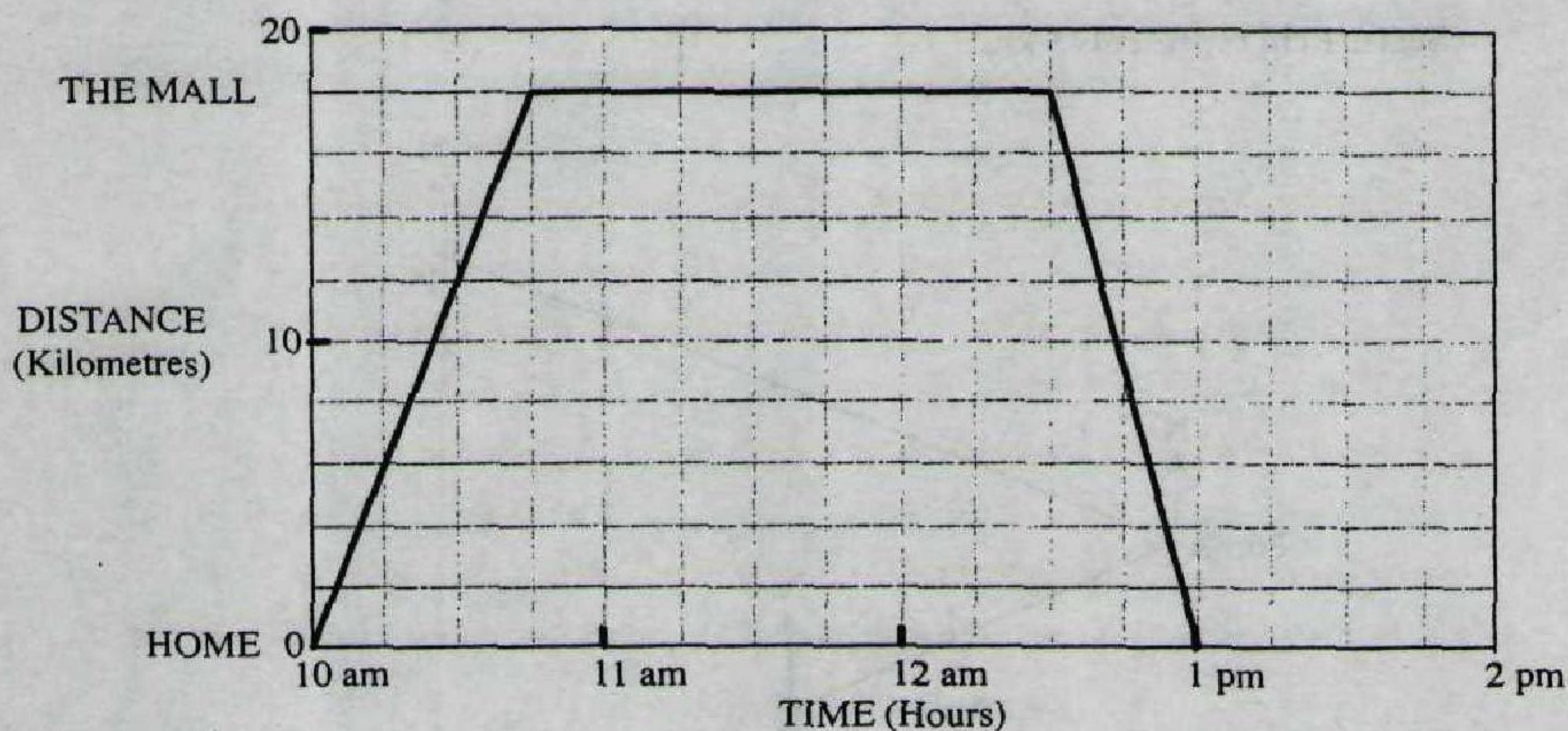


- (a) Give the shortest distance (in km) between boats **P** and **Q**. [2]
- (b) State the bearing of boat **P** from Port **A**. [1]
- (c) Calculate the bearing of Port **A** from boat **Q**. [2]

Boat **Q** sails north a distance of 23.5 km.

- (d) Calculate the length north from **Q** that this would be on the scale drawing. [2]
-

12.

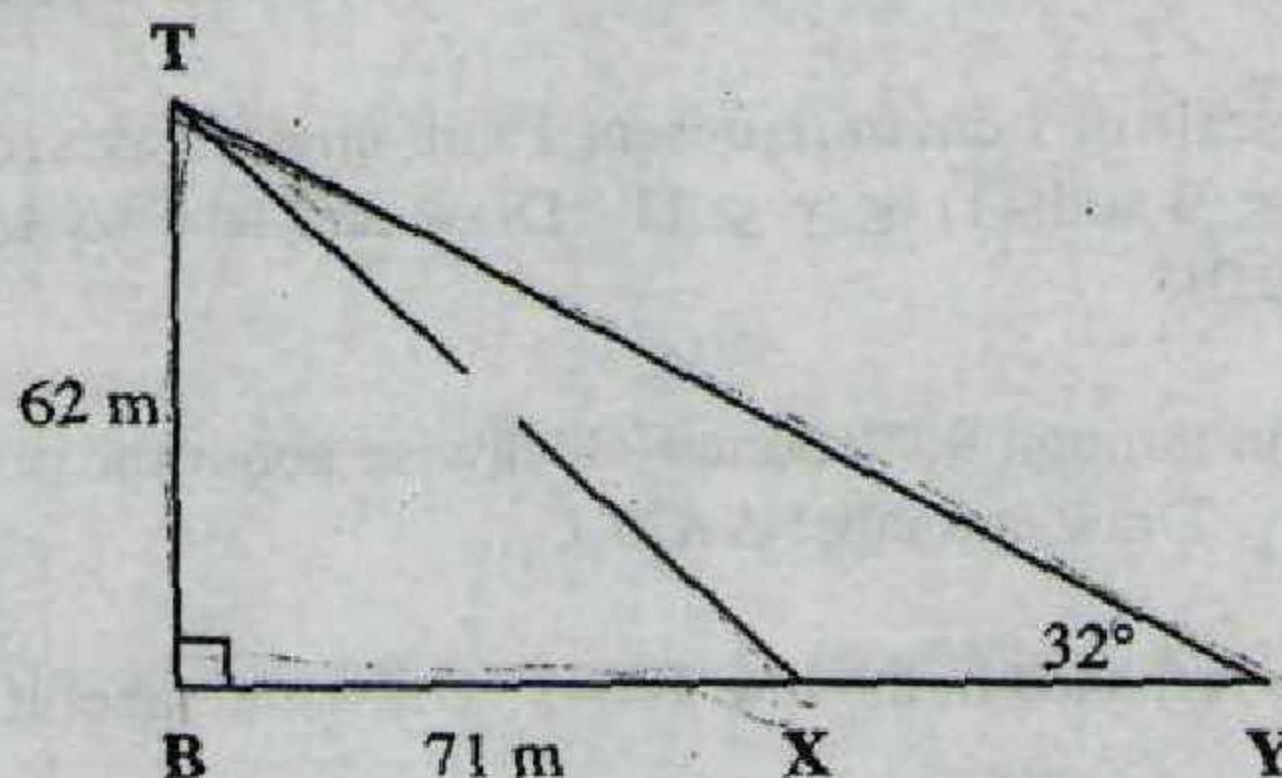


The travel graph shows Marian's car trip from Home to The Mall and back again.

Using information from the graph, calculate

- the distance from her home to the mall, [1]
- the time she arrived at the mall, [1]
- the average speed of her journey to the mall, [2]
- the length of time she spent at the mall, [2]
- the average speed for the entire trip. [2]

13.



A TV transmitter tower, **TB**, is 62 m high. It is anchored by a cable **TX** fastened at **X** on level ground 71 m from the base **B**. Cable **TY** makes an angle of 32° with the ground.

- (a) Assuming that the cables are taut, calculate
- (i) the length of cable **TX**, [3]
 - (ii) the length of cable **TY**. [3]
- (b) Find the angle which cable **TX** makes with the ground. [3]
-

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

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

x	-5	-1	1	2
y		2		8

[2]

- (b) Using a scale of 1 cm to 1 unit for each axis, draw the graph of the line $y = 2x + 4$. [3]
- (c) Calculate the gradient of your graph in (b). [2]
- (d) Another graph goes through the point (5,2) and has a gradient of $-\frac{2}{3}$. Draw the graph on the same coordinate plane. [3]
- (e) Write down the coordinates of the point where the lines intersect. [2]
-

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

- (a) Using a scale of 1 cm to represent 1 unit on each axis, draw x and y axes from $-9 \leq x \leq 9$ and $-11 \leq y \leq 11$. Draw and label $\triangle ABC$ with $A(2,2)$, $B(0,1)$ and $C(-2,3)$. [3]
- (b) A rotation through 90° counter-clockwise about the origin maps $\triangle ABC$ onto $\triangle A_1B_1C_1$. Draw and label $\triangle A_1B_1C_1$. [2]
- (c) $\triangle ABC$ is reflected in the line $y = -3$. Draw and label it $\triangle A_2B_2C_2$. [3]
- (d) A translation of $\begin{pmatrix} 5 \\ -3 \end{pmatrix}$ maps $\triangle ABC$ onto $\triangle A_3B_3C_3$. Draw and label $\triangle A_3B_3C_3$. [2]
- (e) $\triangle ABC$ is enlarged by a scale factor of 3, centre the origin. Draw and label the image $\triangle A_4B_4C_4$. [2]
-

MATHEMATICS**PAPER 3 (EXTENDED) 3815/3****Wednesday 28 MAY 2008 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 [].

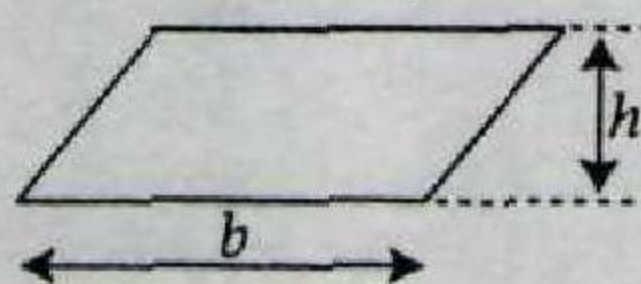
The total number of marks for this paper is 100.

This question paper consists of 9 printed pages and 3 blank pages.

INFORMATION AND FORMULAE

MENSURATION

Parallelogram



$$\text{Area} = bh$$

Circle (radius r , diameter d)

Cylinder (radius r , height h)

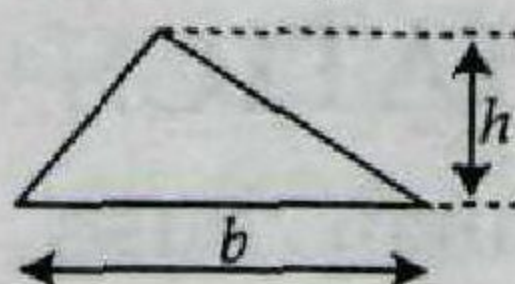
Sphere (radius r)

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

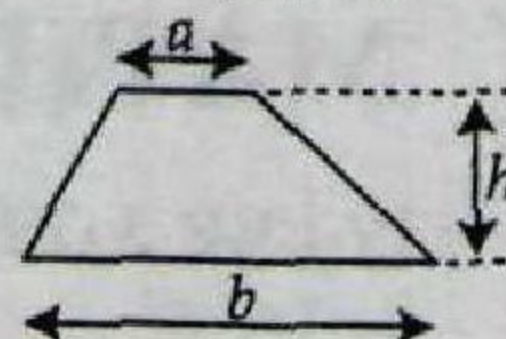
Volume

Volume

Volume

Area of curved surface

Trapezium



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

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

$$= \pi r^2$$

$$= \pi r^2 h$$

$$= 2\pi r h$$

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

$$= 4\pi r^2$$

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

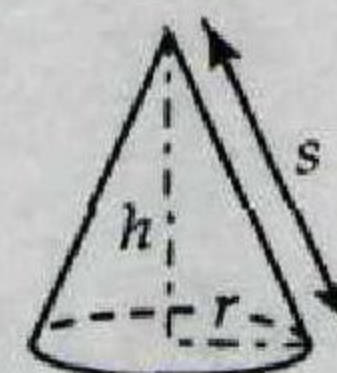
$$= \frac{1}{3} \times \text{area of base} \times \text{height}$$

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

$$= \pi r s$$

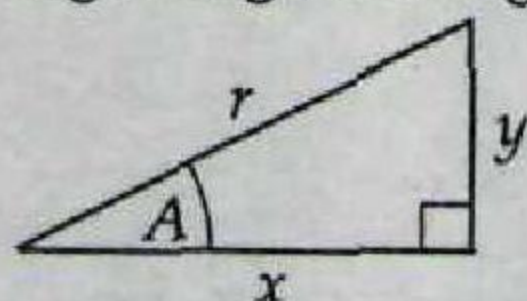
$$\text{where } s = \text{slant height } \sqrt{h^2 + r^2}$$

Cone

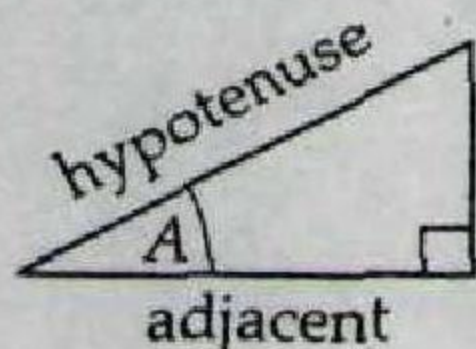


TRIGONOMETRY

Right-angled triangle



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

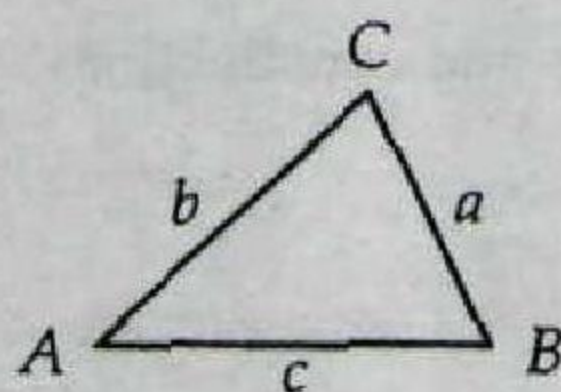


opposite

adjacent

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

Any triangle



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

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

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

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

NUMBER ALGEBRA

Standard form is $a \times 10^n$ where $1 \leq n < 10$ 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 $\frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

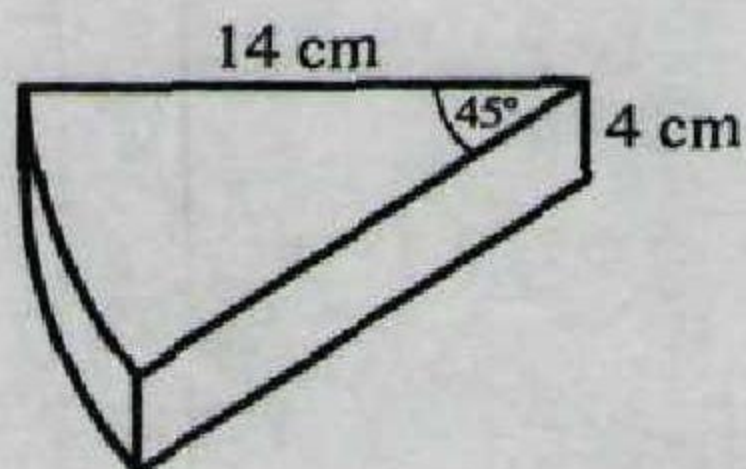
If $y = ax^n$, then $\frac{dy}{dx} = anx^{n-1}$

1. Solve for x

$$5^{x-3} = 1$$

[2]

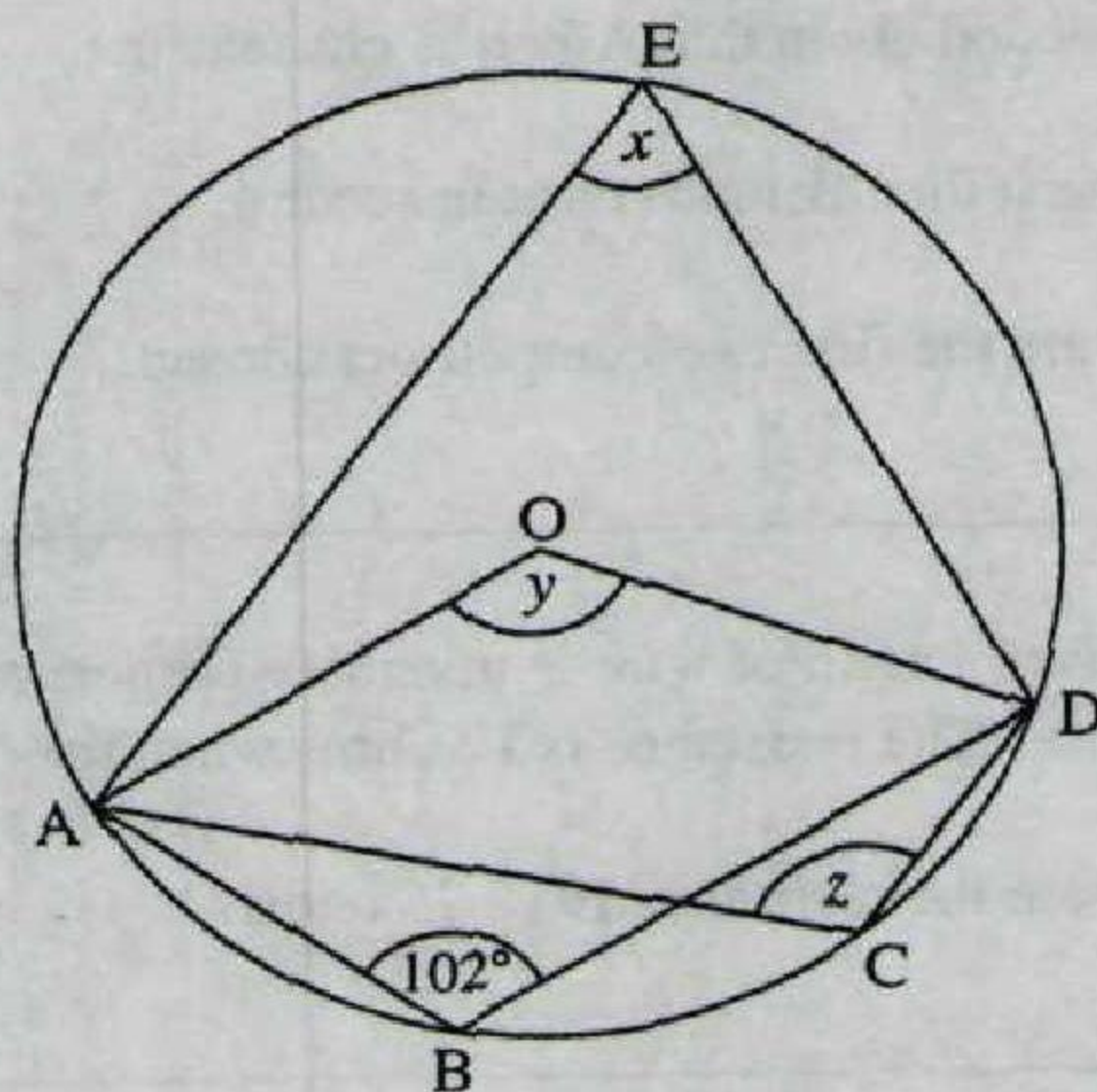
- 2.



NOT TO SCALE

The diagram shows a wedge of cheese which forms part of a cylinder of radius 14 cm and thickness 4 cm. The cross-section of the wedge is a sector of a circle making an angle of 45° at the centre. Taking $\pi = \frac{22}{7}$, calculate the volume of the wedge. [3]

- 3.



NOT TO SCALE

In the circle ABCDE with centre O, $\angle ABD = 102^\circ$. Write down the value of

(a) x , [1]

(b) y , [1]

(c) z . [1]

4. The Real Estate Agent receives a standard rate of commission of 4% on the sale of a house. Calculate
- (a) the commission on the sale of a house costing \$156 000, [2]
- (b) the selling price of a house when the commission is \$6 960. [2]
-

5. Solve for p and q .

$$\begin{pmatrix} p & 3 \\ 4 & -2 \end{pmatrix} \begin{pmatrix} 1 \\ q \end{pmatrix} = \begin{pmatrix} 5 \\ 0 \end{pmatrix}$$

[4]

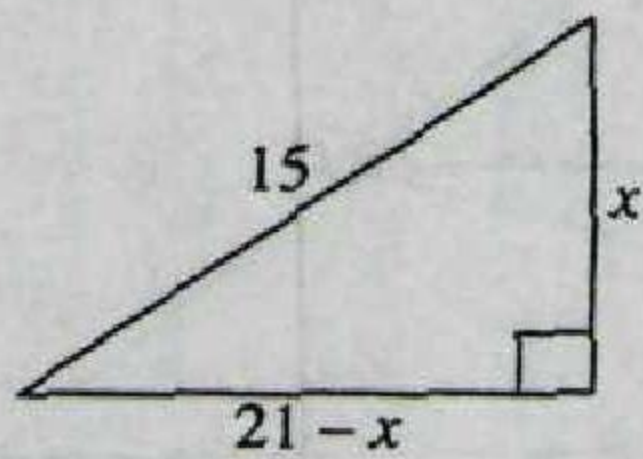
6. At the *Summer Sports Competition*, names are chosen at random in a sports event to determine the order in which participants will compete. Albert and Brian along with six other participants are competing in an event. Calculate the probability that

- (a) Albert is chosen first, [1]
- (b) Brian is chosen second given that Albert is chosen first, [1]
- (c) Albert is chosen first then Brian is chosen second, [1]
- (d) Albert and Brian are the first two competitors chosen. [2]
-

7. The resistance (R) in a given length of wire is inversely proportional to the square of the diameter (d) of the wire. The resistance is 12 ohms when the diameter is 2 mm.

Calculate the diameter when the resistance is 18.75 ohms. [5]

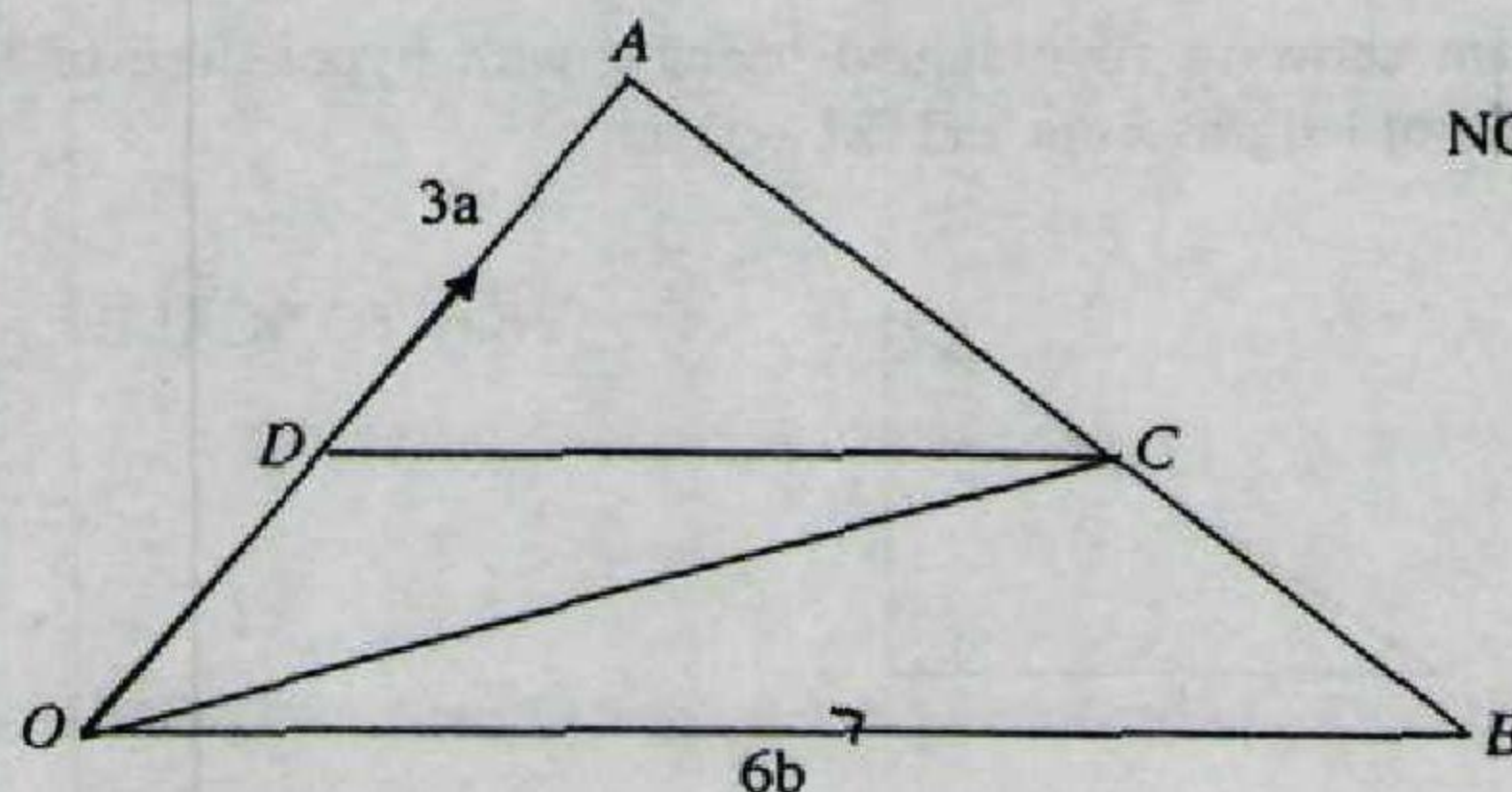
8. The diagram shows a right-angled triangle with hypotenuse of length 15 cm and shorter sides of lengths x cm and $(21 - x)$ cm.



NOT TO SCALE

- (a) Write down an equation that shows the relationship between the three sides. Show that the equation simplifies to $x^2 - 21x + 108 = 0$. [4]
- (b) Solve the equation to find the possible values of x . [3]
-

9.



In the triangle OAB , $\overrightarrow{OA} = 3a$, $\overrightarrow{OB} = 6b$, $AC = \frac{2}{3}AB$ and $DA = kOA$.

(a) Find, in terms of a , b and/or k , simplifying where possible

(i) $\overrightarrow{AB}$, [1]

(ii) $\overrightarrow{AC}$, [1]

(iii) $\overrightarrow{OC}$, [2]

(iv) $\overrightarrow{DC}$. [2]

(b) DC is parallel to OB . Calculate the value of k . [3]

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

(a) the value of $f(7)$, [1]

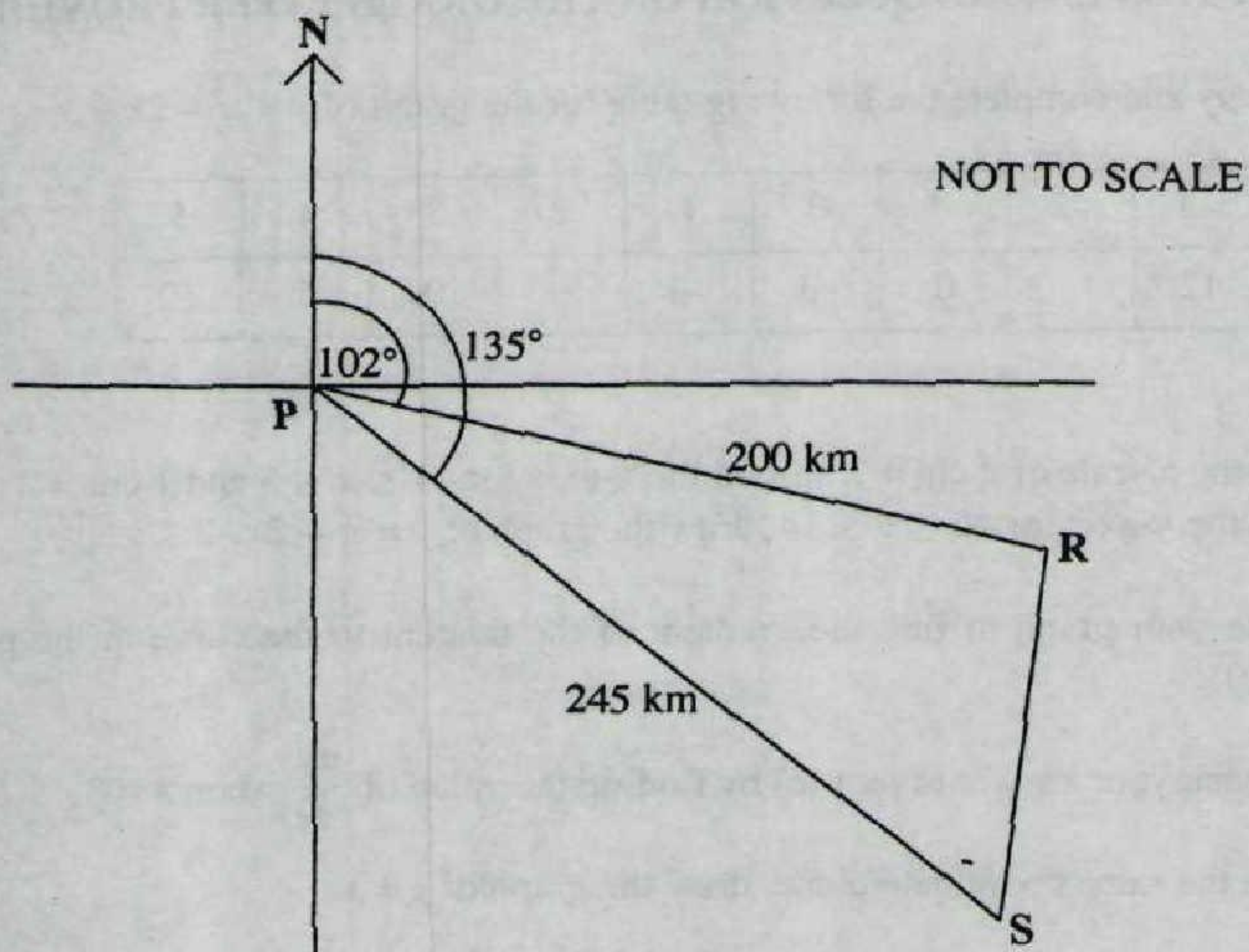
(b) x where $g(x) = 11$, [2]

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

(d) the inverse of $g(x)$, [2]

(e) values of x for which $f(x) \leq g(x)$. [3]

11.



A mail boat service makes regular excursions from the home Port **P** to Port **R** to Port **S** and back to Port **P**.

Port **R** is 200 km from Port **P** on a bearing of 102° .

- (a) Calculate the bearing of Port **P** from Port **R**. [1]

Port **S** is 245 km from Port **P** on a bearing of 135° .

- (b) Calculate
- (i) the distance between Port **R** and Port **S**, [4]
 - (ii) the angle **RSP**. [4]

Another ship sails from Port **S** to Port **P**.

- (c) Calculate, to the nearest km, the closest distance it gets to Port **R**. [3]

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

- (a) Copy and complete the following table for the graph of $y = x^2 - 2x - 3$.

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

[2]

- (b) Using a scale of 2 cm = 1 unit on the x-axis for $-3 \leq x \leq 5$ and 1 cm = 1 unit on the y-axis for $-6 \leq y \leq 14$, draw the graph of $y = x^2 - 2x - 3$. [3]
- (c) Use your graph to find the gradient of the tangent to the curve at the point (3,0). [2]
- (d) Check your answer to part (c) by finding the value of $\frac{dy}{dx}$ when $x = 3$. [2]
- (e) On the same coordinate plane, draw the graph of $y = x$. [1]
- (f) Use your graph to solve the equation $x^2 - 3x - 3 = 0$, giving the answers correct to one decimal place. [2]

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

(i) $\frac{x}{5} - \frac{2-x}{3}$ [3]

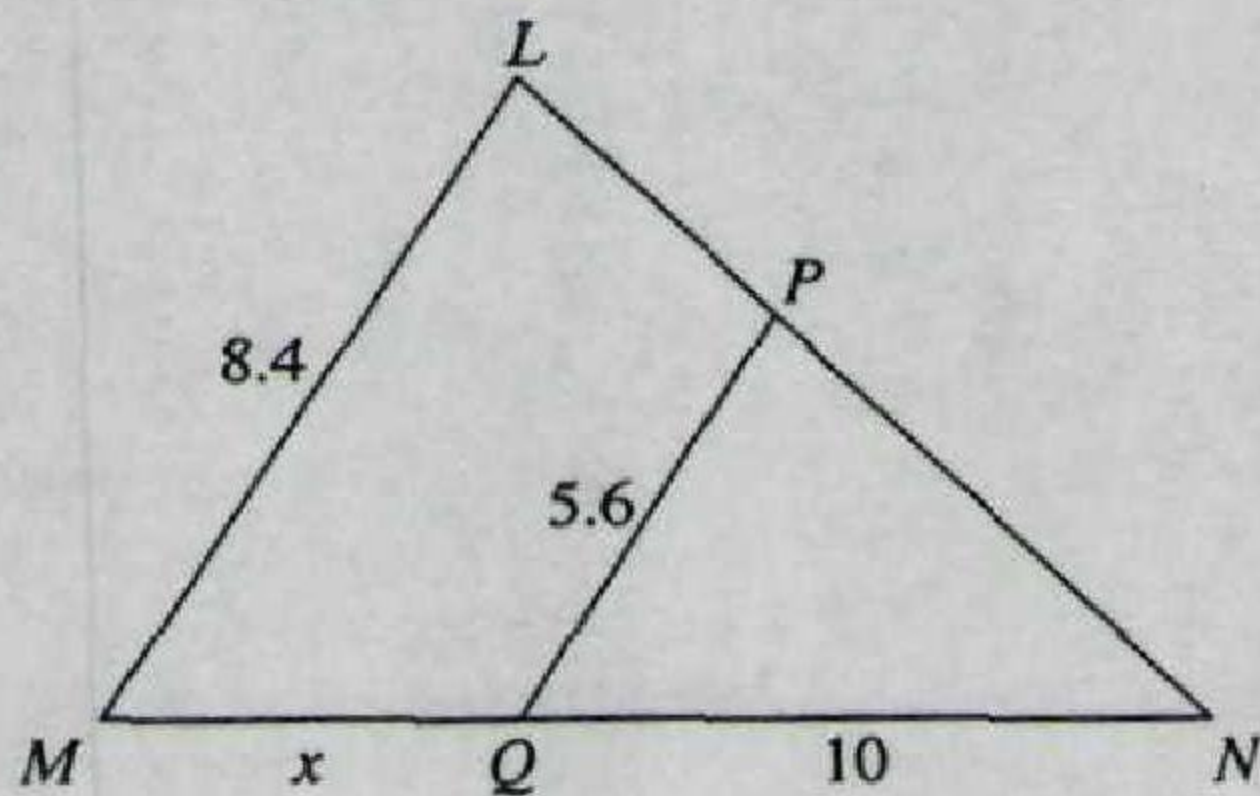
(ii) $\frac{5}{2b} + \frac{4}{3b}$ [3]

(iii) $\frac{21m}{n} + \frac{7m^3}{n^2}$ [3]

- (b) Factorize completely

$xy + 3x + 2y + 6$ [3]

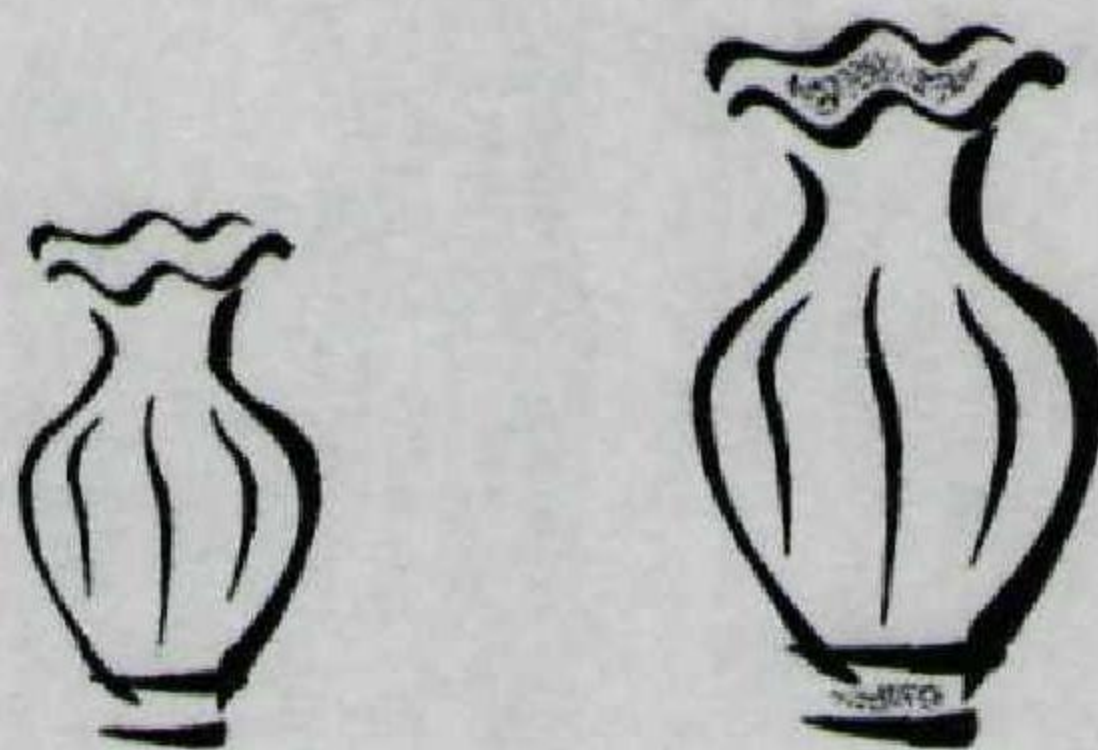
14.



(a) $\triangle LMN$ is similar to $\triangle PQN$. Calculate

(i) the ratio of their corresponding sides in simplest form, [2]

(ii) the value of x . [4]



(b) Two vases are of similar shape. The ratio of their heights is 3:4. The surface area of the smaller vase is 324 cm^2 .

(i) Calculate the surface area of the larger vase. [3]

The volume of the larger vase is 1920 cm^3 .

(ii) Calculate the volume of the smaller vase. [3]