ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER.

1. a) Express 2.00456 to 3 significant figures.

   b) Express $\dfrac{11}{20}$ as a decimal.

   c) Express 3.75 as a percentage.

   d) Evaluate $1\dfrac{1}{3} \times \dfrac{4}{5}$.

   Ans: a) _____ [1]

         b) _____ [1]

         c) _____ % [1]

         d) _____ [1]

2. Using as much of the information below as necessary, write down the value of

   a) $\sqrt{480000}$,

   b) $\sqrt{0.00000480}$,

   c) $\sqrt{120}$.

   $[\sqrt{4.80} = 2.19, \sqrt{48.0} = 6.93]$

Ans: a)_____[2]

         b)_____[2]

         c)_____[2]

3.   Make T the subject of the formula $f = \dfrac{1}{2}\sqrt{\dfrac{T}{m}}$.

Ans: $T =$_____[2]

4. a) Convert 72 km/h into metres per second.

    b) If y varies inversely as the square of x, and $y = 5$ when $x = 4$, find the value of y when $x = 10$.

Ans: a) _____ m/s [2]

b) $y =$ _____ [2]

5 a) Simplify $\dfrac{5x}{x^2 + x - 6} - \dfrac{2}{x - 2}$.
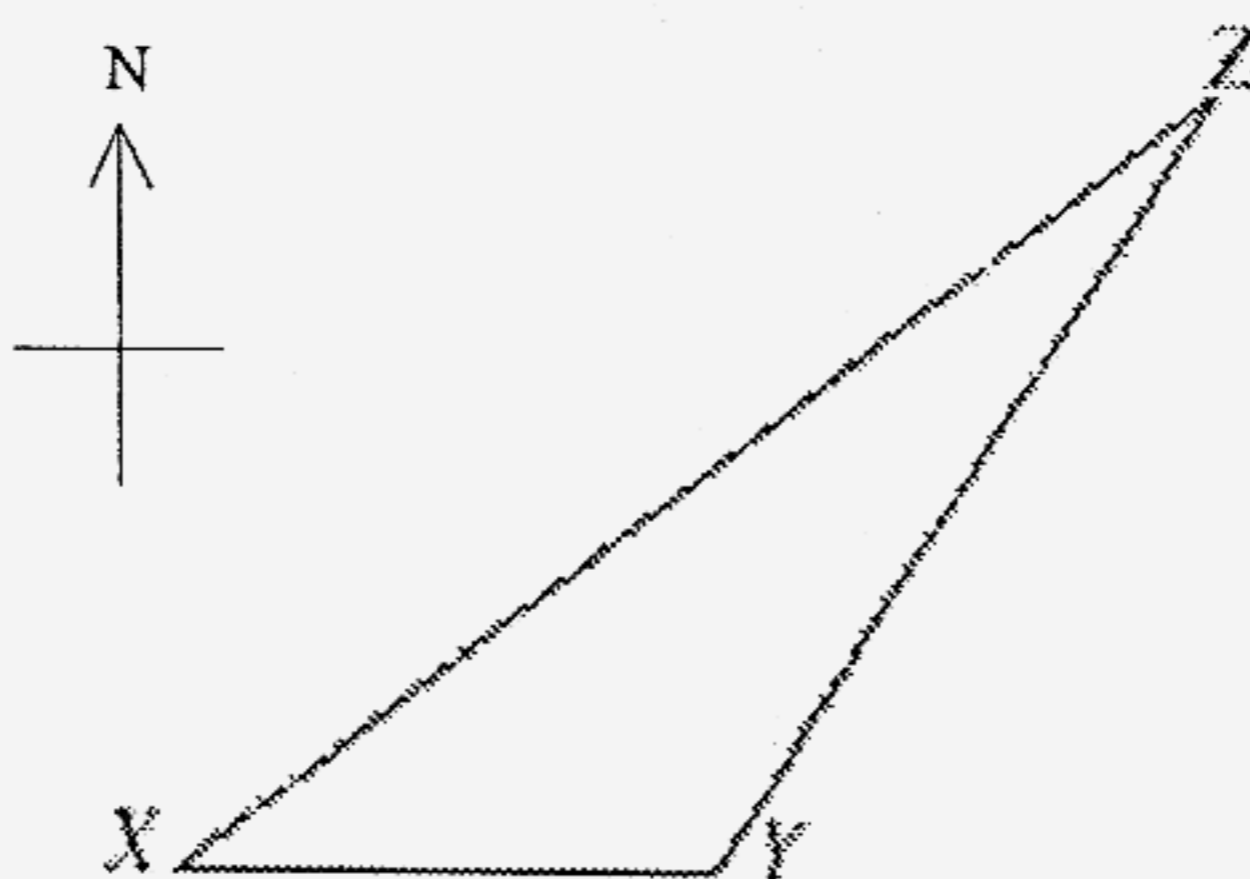
   b) Solve $x + 3 = \dfrac{8}{3 - x}$.

Ans: a) _____ [3]

b) $x =$ _____ [2]

6. In the diagram X, Y and Z represent the locations of three towns. Town Y is due east of X, and the bearing of Z from Y is 046°.

Calculate

a) $\angle XYZ$,

b) the bearing of Y from Z.

N

Z

X   Y

Ans: a) _____ ° [1]

b) _____ ° [1]

7. a) Evaluate $4^{\frac{3}{2}} \times 27^{\frac{2}{3}} \times 5^{0}$.

b) Simplify $\dfrac{4x^2y^3}{3z^4} \div \dfrac{2x^4y^2}{9yz^2}$, giving your answer in positive indices only.

Ans: a) _____ [2]

b) _____ [2]

8. Given that $p = 5 \times 10^8$ and $q = 3 \times 10^9$, find, leaving your answers in standard form,

a) $\dfrac{2q}{p}$,

b) $q{-}p$.

Ans: a) _____ [2]
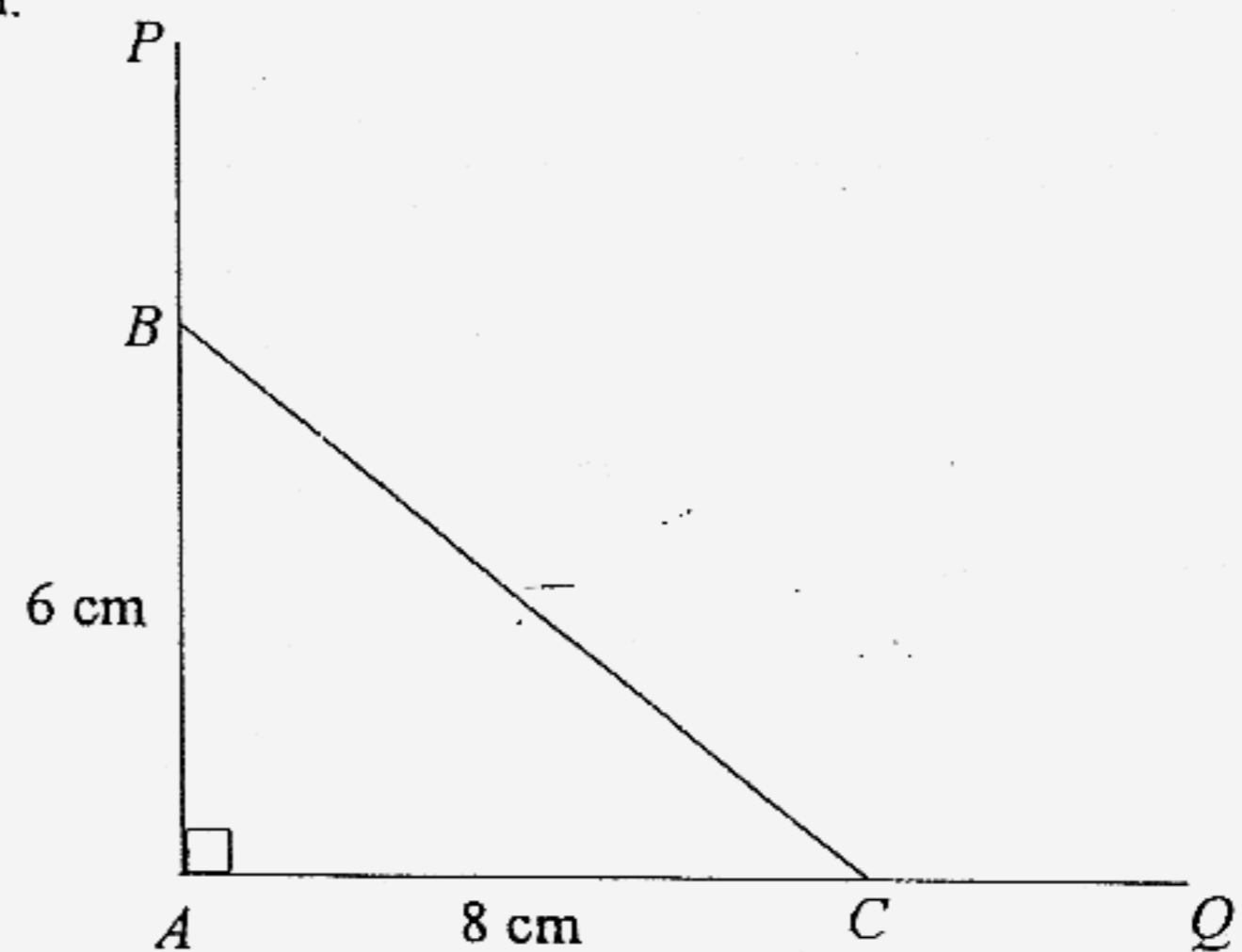
b) _____ [2]

9. Solve the simultaneous equations

$$6p - 7q = 16,$$

$$\frac{3}{5}p + \frac{1}{2}q = 4.$$

Ans: $p =$ _____

$q =$ _____ [3]

10. In the diagram, ABP and ACQ are two straight lines.

$\angle PAQ = 90°$, $AC = 8$ cm and $AB = 6$ cm.

a) Calculate BC.

b) Express as a single fraction

(i) $\cos \angle ACB$,

(ii) $\tan \angle BCQ$,

(iii) $\sin \angle PBC$.

Ans: a) _____ [1]

b) (i) _____ [1]

(ii) _____ [1]

(iii) _____ [1]

11. a) If 12 men can build a house in 12 days, how many men are required to build 2 houses in 9 days if they work at the same rate?

b) Lynette deposited $1000 in a bank which pays a simple interest of 5% per annum. At the end of 2 years, she withdrew all the money. How much money did she receive?

Ans: a) _____men [2]

b) $_____ [2]

12. A plan of a garden is drawn to a scale of 1: 50.

a) Expressing your answer in centimetres, calculate the length of the line on the plan which represents a path of 13 metres long.

b) Expressing your answer in square metres, calculate the area of a pond which is represented on the plan by an area of 200 cm^2.

Ans: a) _____cm [1]

b) _____m^2 [2]

13. Given that $-1 \le x \le 8$ and $2 \le y \le 10$, calculate

a) the smallest value of $x + y$,

b) the greatest value of $\dfrac{2x}{y}$,

c) the smallest value of $3x^2 + 3y^2$.

Ans: a) _____ [1]

b) _____ [1]

c) _____ [1]

14. The diagram shows the graph of the line, $y + 6x - 15 = 0$.
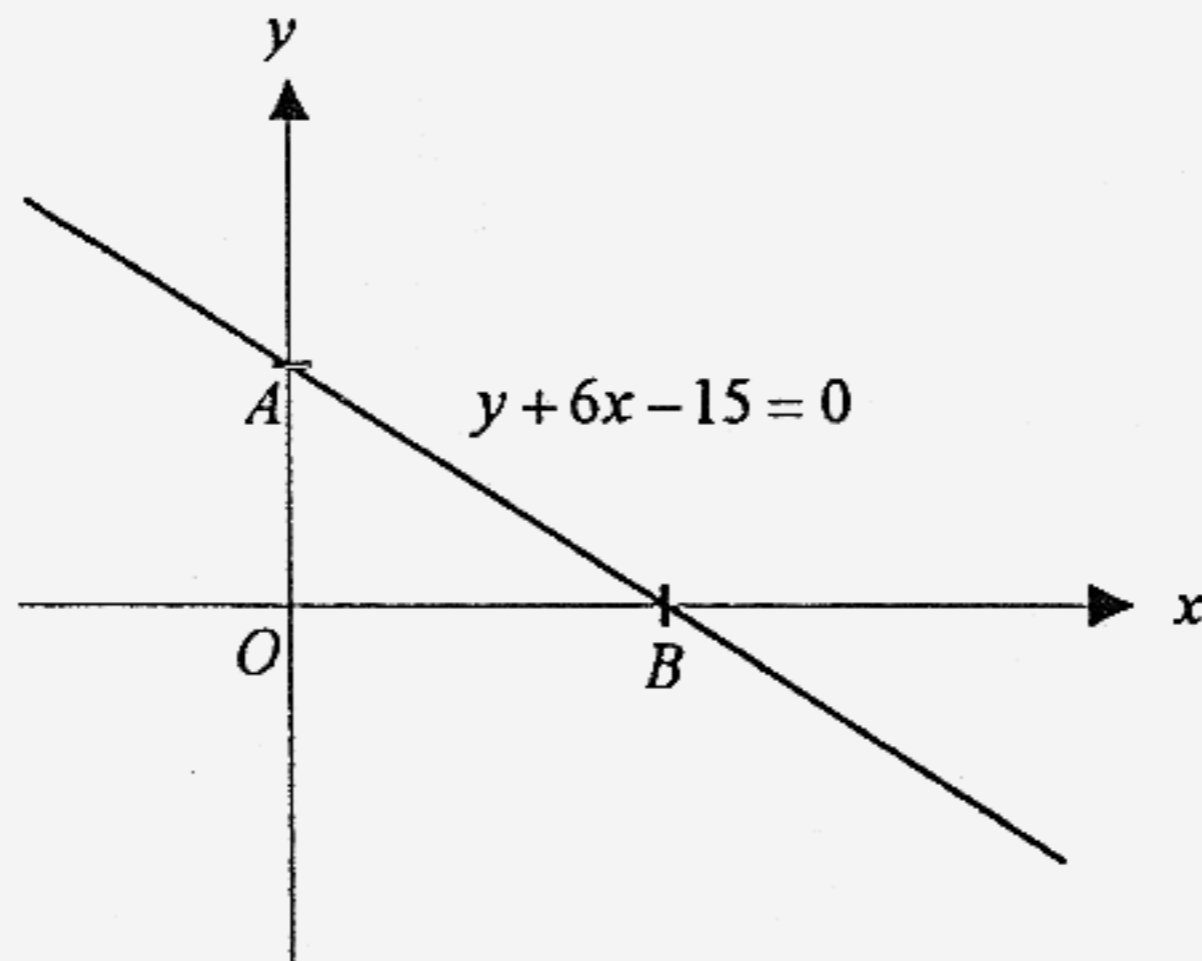
a) Find the gradient of the line.

b) Find the coordinates of the points A and B.

c) Write down the equation of the line that passes through B and perpendicular to the x-axis.

Ans: a) _____ [1]

     b) $A = ($ _____ , _____ $)$ [1]

     $B = ($ _____ , _____ $)$ [1]

     c) _____ ___ [1]

15. The bar chart shows the number of books read by the pupils of a class in a certain month.

Find

a) the mode of the distribution,

b) the total number of pupils in the class,

c) the mean number of books read by a pupil in a class.
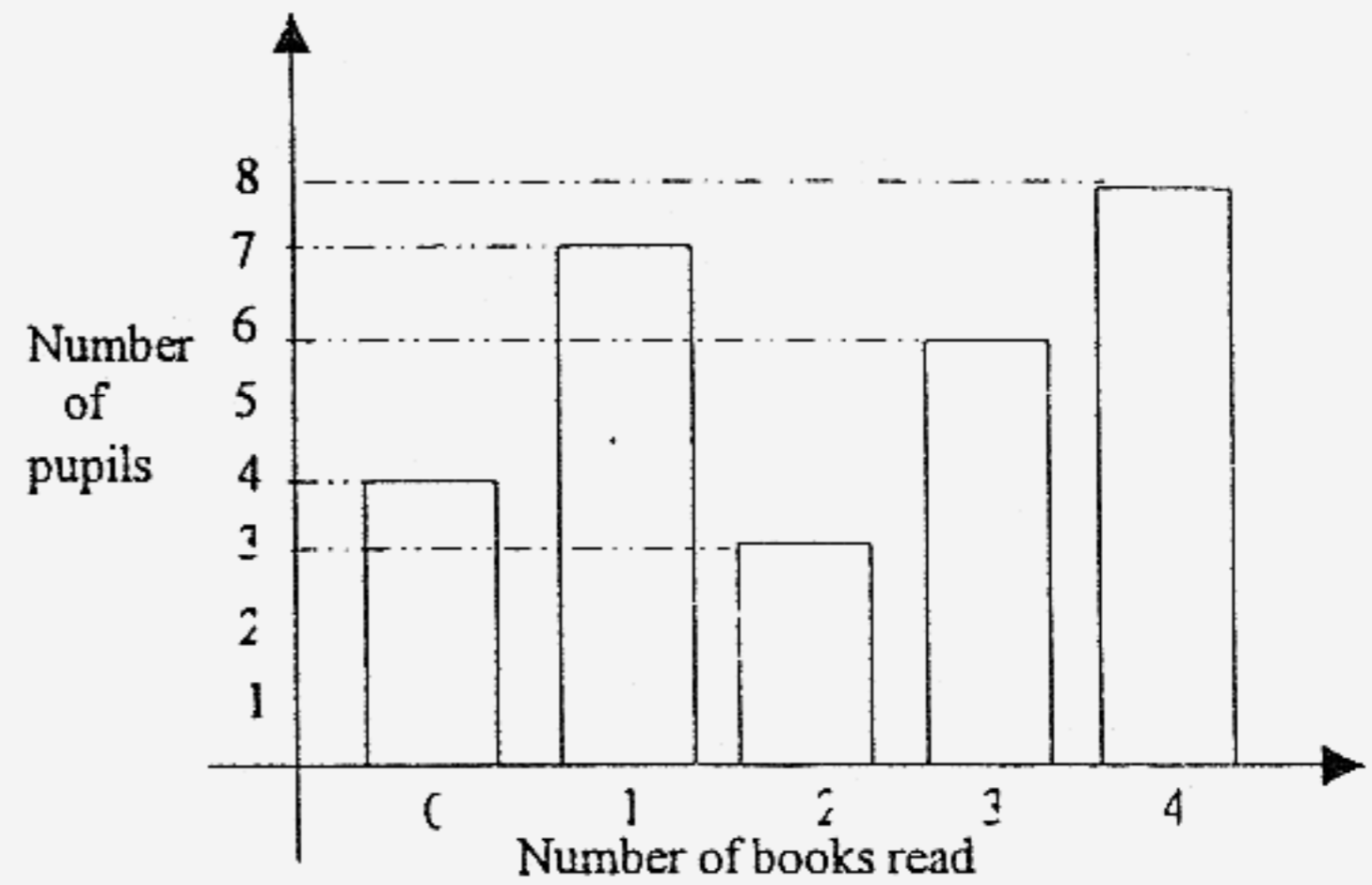
Ans: a) _____ [1]

b) _____ pupils [1]

c) _____ books [2]

16. *AC* is a diameter of a circle with centre *O*. *B* and *D* are points on the circle. *RT* is a tangent to the circle at *B*. *BD* intersects *AC* at *S*. Given that $\angle AOB = 76°$ and $\angle DBC = 18°$, stating your reasons clearly, calculate

a) $\angle RBA$,

b) $\angle OBD$,

c) $\angle DSC$.
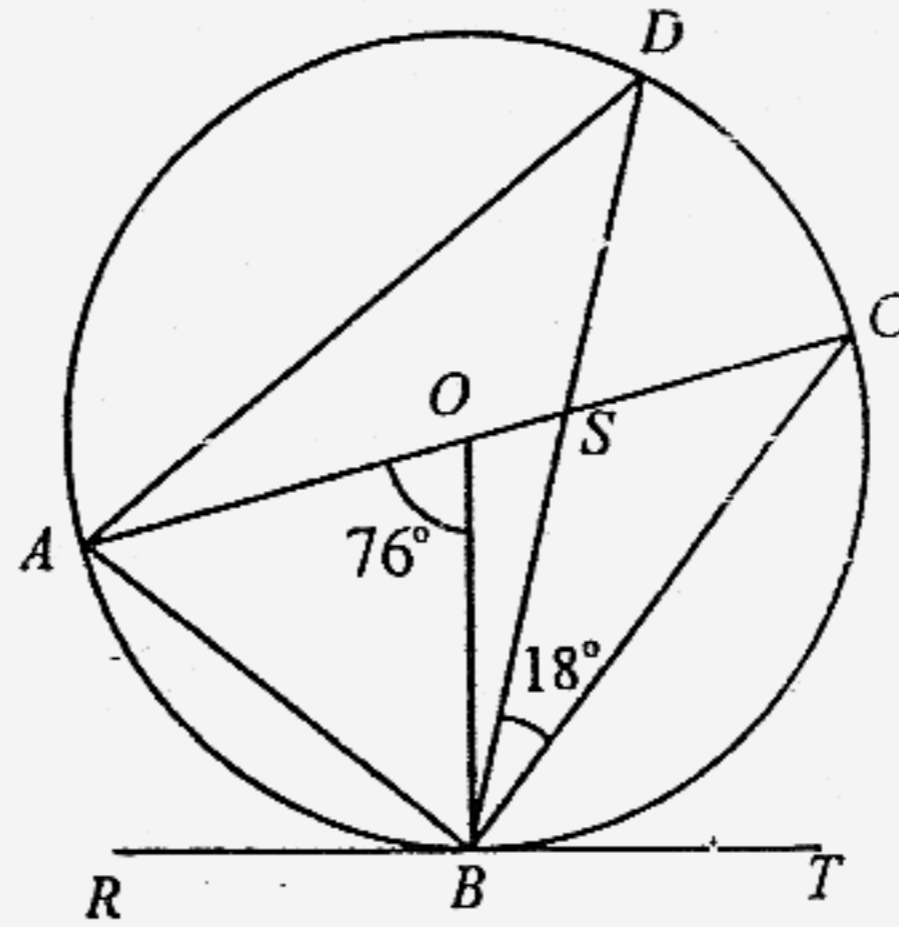
Ans: a) _____ [2]

b) _____ [2]

c) _____ [2]

17. A, B, C and D are points on a semi-circle with centre O, diameter AD and radius 7 cm. Given that the chord AB is 7 cm and the arc CD is 8.8 cm, calculate the ratio of the shaded region to the area of the semicircle. (Take $\pi = \dfrac{22}{7}$).
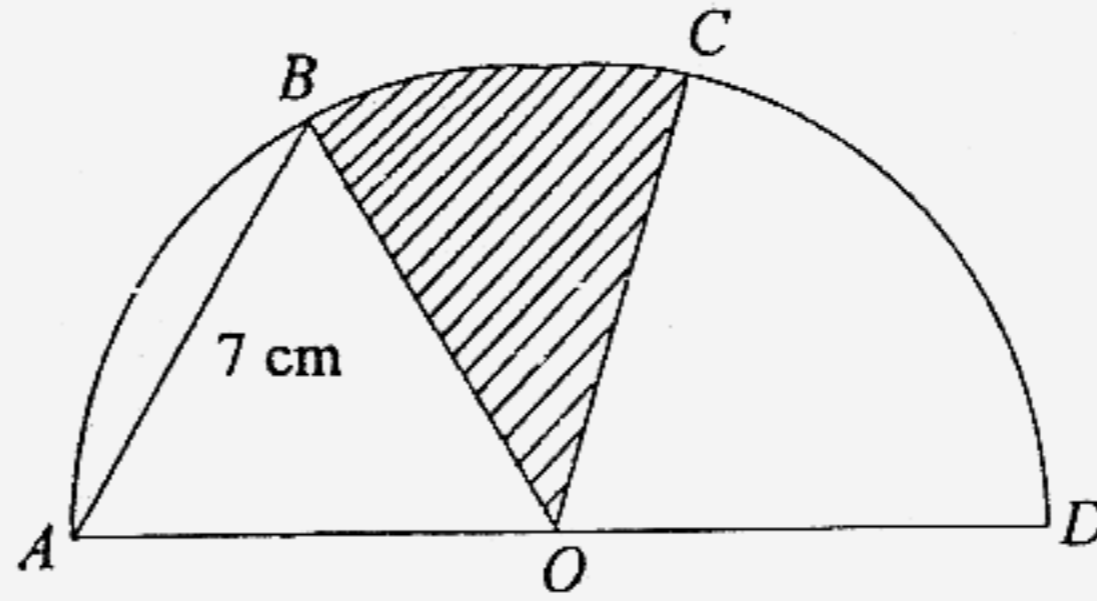
Ans: _____ [4]

18. In the diagram, $AB = 8$ cm, $BC = 3$ cm and BE is parallel to CD.
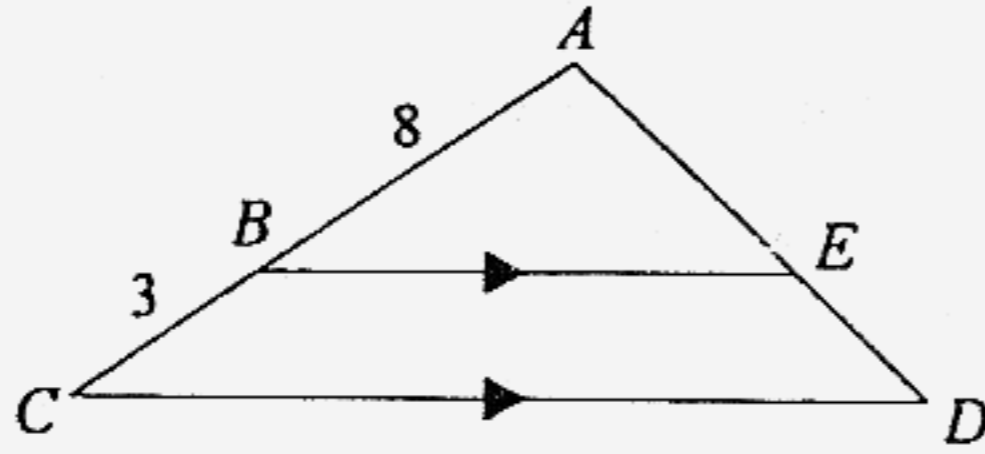
a) Prove that $\triangle ABE$ and $\triangle ACD$ are similar, stating your reasons clearly.

b) Find the value of

(i) $\dfrac{BE}{CD}$,

(ii) $\dfrac{\text{Area of triangle } ABE}{\text{Area of triangle } ACD}$,

(iii) $\dfrac{\text{Area of triangle } ABE}{\text{Area of quadrilateral } BCDE}$.

Ans: a) _____

_____

_____ [2]

Ans: b) i) _____ [1]

ii) _____ [1]

iii) _____ [1]

19. The curve $y = ax^2 + bx + c$ cuts the x-axis at $A(-2, 0)$ and $B(4, 0)$ and cuts the y-axis at $C(0, -8)$.

a) Find the values of a, of b and of c.

b) The point $(5, k)$ lies on the curve. Find the value of k.
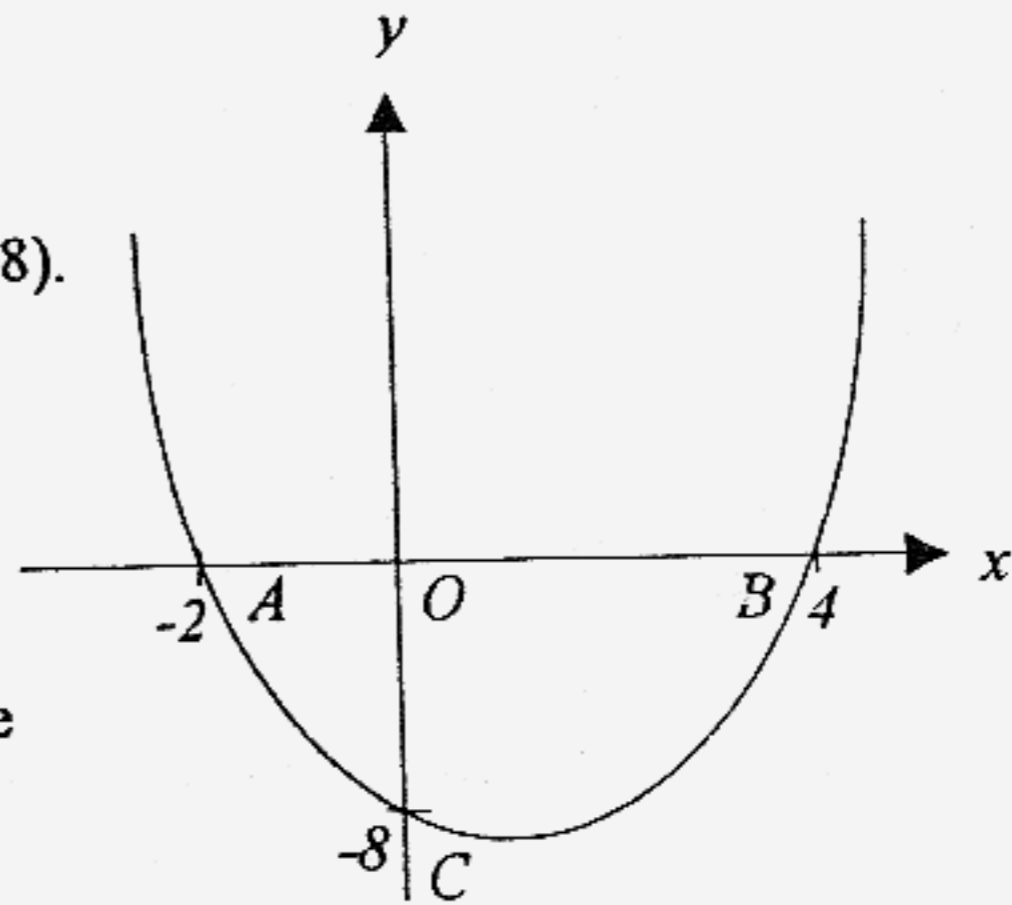
Ans: a) $a = $ _____ [1]

b) $b = $ _____ [1]

$c = $ _____ [1]

b) $k = $ _____ [1]

20. The diagram shows a sequence of patterns formed by square tiles.
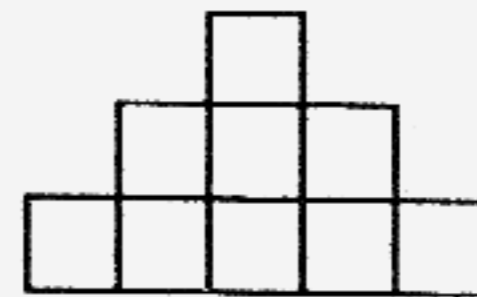
Pattern 1   Pattern 2   Pattern 3

The number of tiles in the bottom layer and the total number of tiles used in each pattern are calculated and tabulated as shown below.

Pattern Number (n)	Number of Tiles in the Bottom Layer (L)	Total Number of Tiles Used (M)
1	1	1
2	3	4
3	5	9
⋮	⋮	⋮
7	a	b

By considering the pattern information in the above table, answer the questions below.

a) Find the value of a and of b.

b) Find the number of tiles at the bottom layer in the nth pattern in terms of n.

c) Express M in terms of L.

Ans: a) $a = $ _____ $b = $ _____ [2]

b) _____[1]

c) $M = $ _____ [2]

End of Paper

Index Number	Class	Name

CHIJ ST JOSEPH'S CONVENT

SEMESTRAL ASSESSMENT 2

ELEMENTARY MATHEMATICS

Paper 2

Secondary Three Express

4017

11 Oct 2006

2 hours 30 minutes

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces at the top of this page and on all the work that you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A

Answer all questions.

Section B

Answer one question.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

Show all your working on the same page as the rest of the answer.

Omission of essential working will result in loss of marks.

The total mark for this paper is **100**.

You are expected to use an electronic calculator to evaluate numerical expressions.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to 1 decimal place.

For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

100

This document consists of **11** printed pages.
Setter: Mr Yeo Ghee

[Turn over
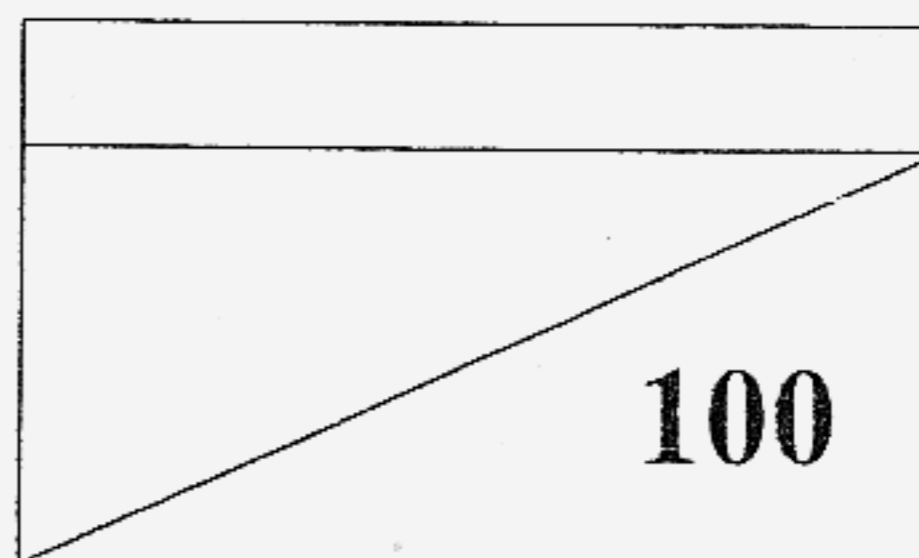
Section A [88 marks]

Answer all the questions in this section.

1   A stone is released from the top of a cliff into the sea. The distance, d metres, through which the stone is dropped is found to be proportional to the square of the time, t seconds, after the stone is released.

    (a)   Write down a formula for d in terms of t and a constant k.   [1]

    (b)   After 3 seconds, the stone is 72 metres away from the top of the cliff.
    Use the formula to find the value of k.   [1]

    (c)   Find the distance of the stone from the top of the cliff 6 seconds after the stone is released.   [1]

---

2   **(a)**   Find the values of x which satisfy the inequalities

$$\frac{x-1}{3} < \frac{2x+2}{5} < 4.$$

Illustrate your answer with a number line.   [4]

    (b)   Given that $2(x-y) = \frac{1}{2}(3x-2y)$, find x in terms of y.

Hence, or otherwise, find the value of $\frac{7x-2y}{8y+x}$ in its simplest form.   [3]
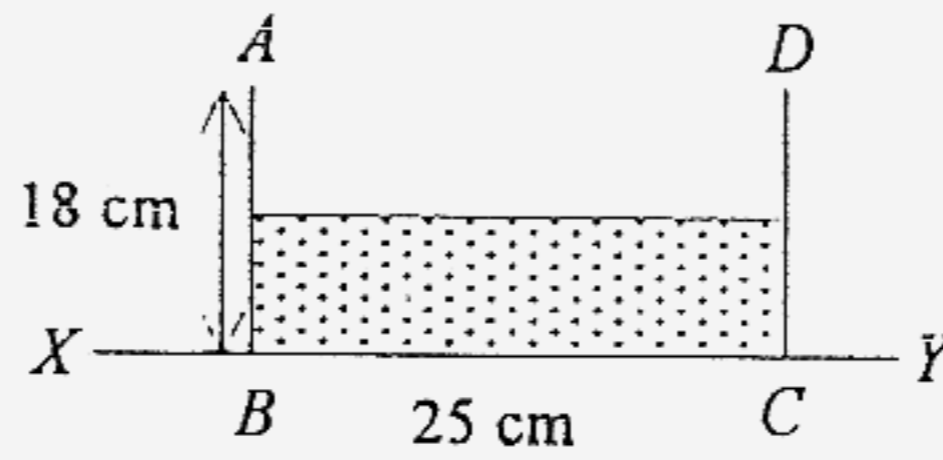
Figure 1

Figure 1 shows a vertical cross-section of a rectangular tank that stands on a horizontal table represented by *XY*. The tank is 18 cm high and has a square base of side 25 cm and contains 6750 cm³ of water. Calculate

(a)   the volume of the tank,   [1]

(b)   the depth of the water.   [1]
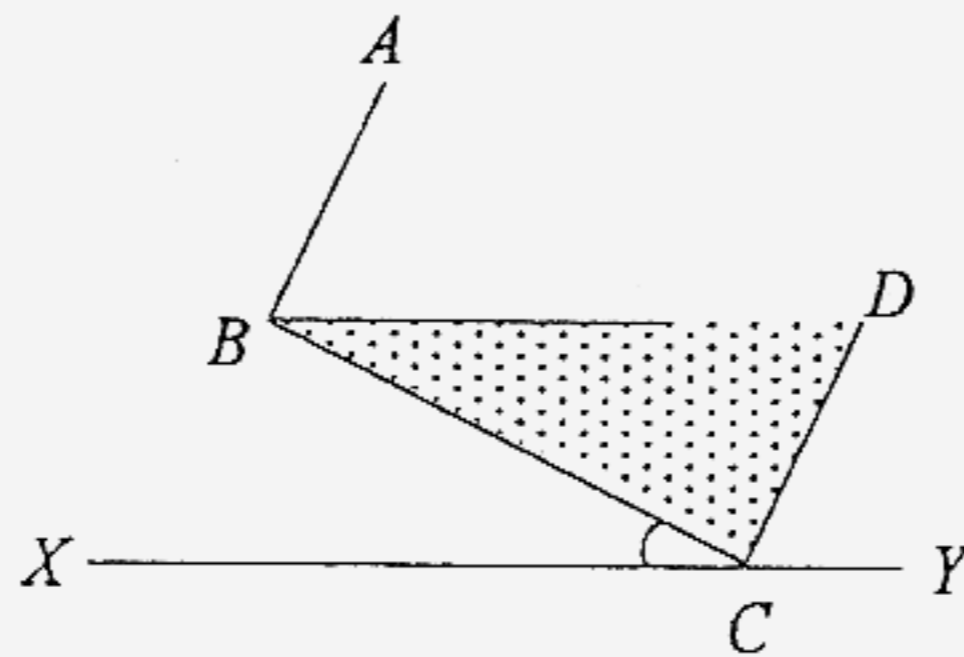
Figure 2

The tank is now tilted about a base edge through *C* with *BD//XY*, so that some of the water spills out until the position shown in Figure 2. Calculate

(c)   the volume of water that is remaining in the tank,   [2]

(d)   ∠*BCX*,   [2]

(e)   the vertical height of *B* above the table.   [2]

4   A circle, centre O, passes through A, B, C and D. $PDOB$ is a straight line.
PAT is a tangent to the circle.
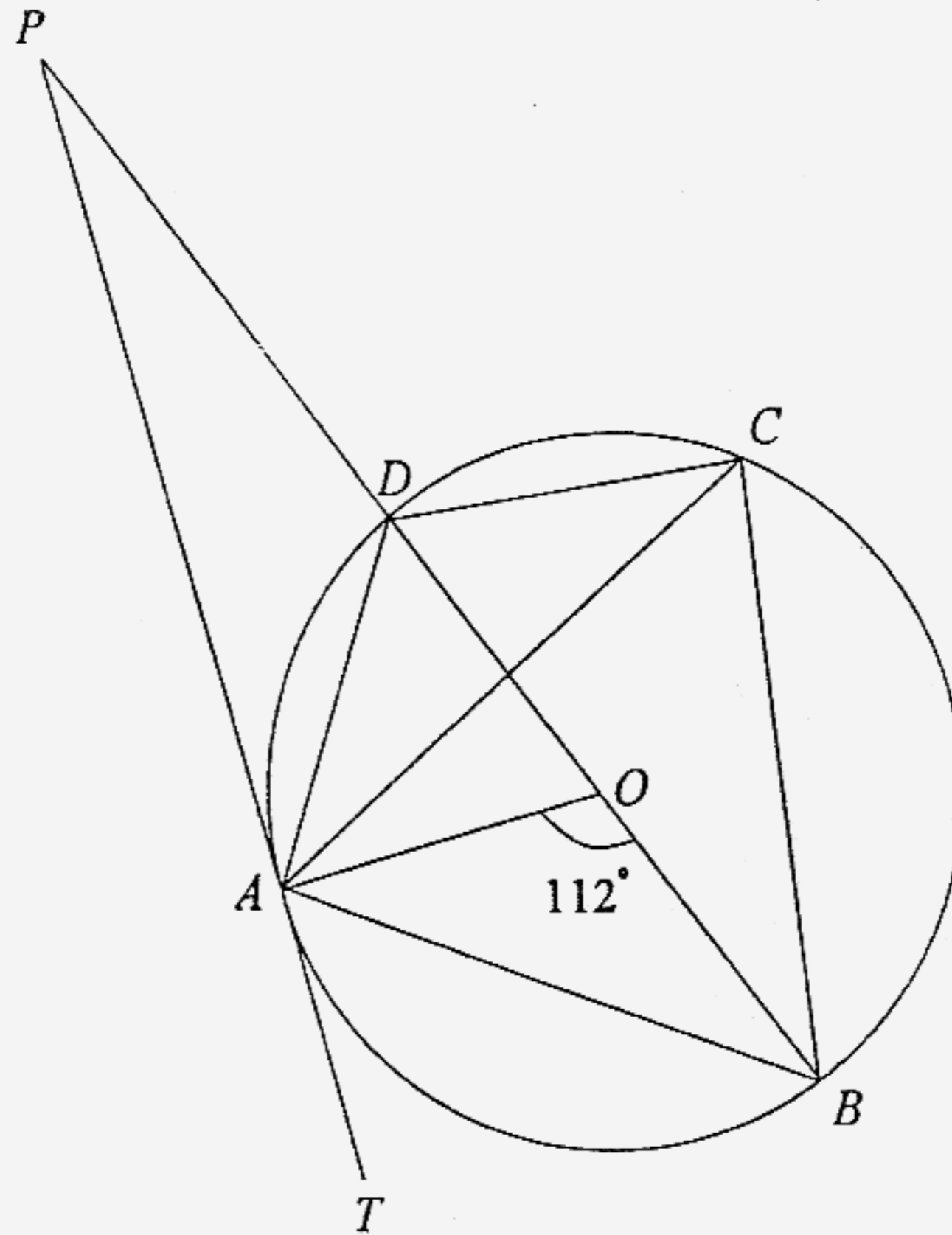
Given that $\angle AOB = 112°$ and $AD = DC$, calculate, by stating your reasons clearly,

(a) $\angle APO$,   [2]

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

(c) $\angle DCA$,   [2]

(d) $\angle PDC$.   [2]

5 **(a)** Jeremy wants to buy a new personal computer that costs $3200. He decides to buy it by hire purchase, with 25% deposit followed by 12 equal monthly instalments. Calculate the amount that he has to pay monthly.   [2]

(b) Jane invested a sum of money in a savings account at a simple interest of 4.5% per year. At the end of 5 years, she had $1,200 in her account. Calculate the sum of money she invested. Give your answer correct to the nearest dollar. [2]

(c) Gregory and Lionel went to moneychanger A before they went for their holiday trip to the United States of America. The exchange rate, offered by moneychanger A, between Singapore Dollars (S$) and U.S. Dollars (US$) was S$1 = US$0.64.

   (i) Gregory changed S$2,500 into U.S. Dollars. Calculate how many U.S. Dollars he received. Give your answer correct to the nearest dollar.   [1]

   For part (ii), use the exchange rate offered by moneychanger A.

   (ii) A digital camera costs S$650 *(inclusive of all the prevailing sales taxes)* in Singapore.

   If the same camera is sold at US$435 *(inclusive of all the prevailing sales taxes)* in the United States, is it better for Gregory to buy the camera in Singapore or the United States?
   Explain your answer.   [2]

   (iii) Lionel went to moneychanger B and this moneychanger offered to change US$1,975 for S$3,000. Which moneychanger offered a better exchange rate? *Explain your answer.*   [2]

6   The diagram shows a metal plate *ABCDEFGH* of negligible thickness. Four quadrants of circles of radius r cm and a circle of radius $2r$ at the centre have been cut out. The length of *AB* is 18 cm and the length of *CD* is 15 cm.

[Take $\pi = \dfrac{22}{7}$]
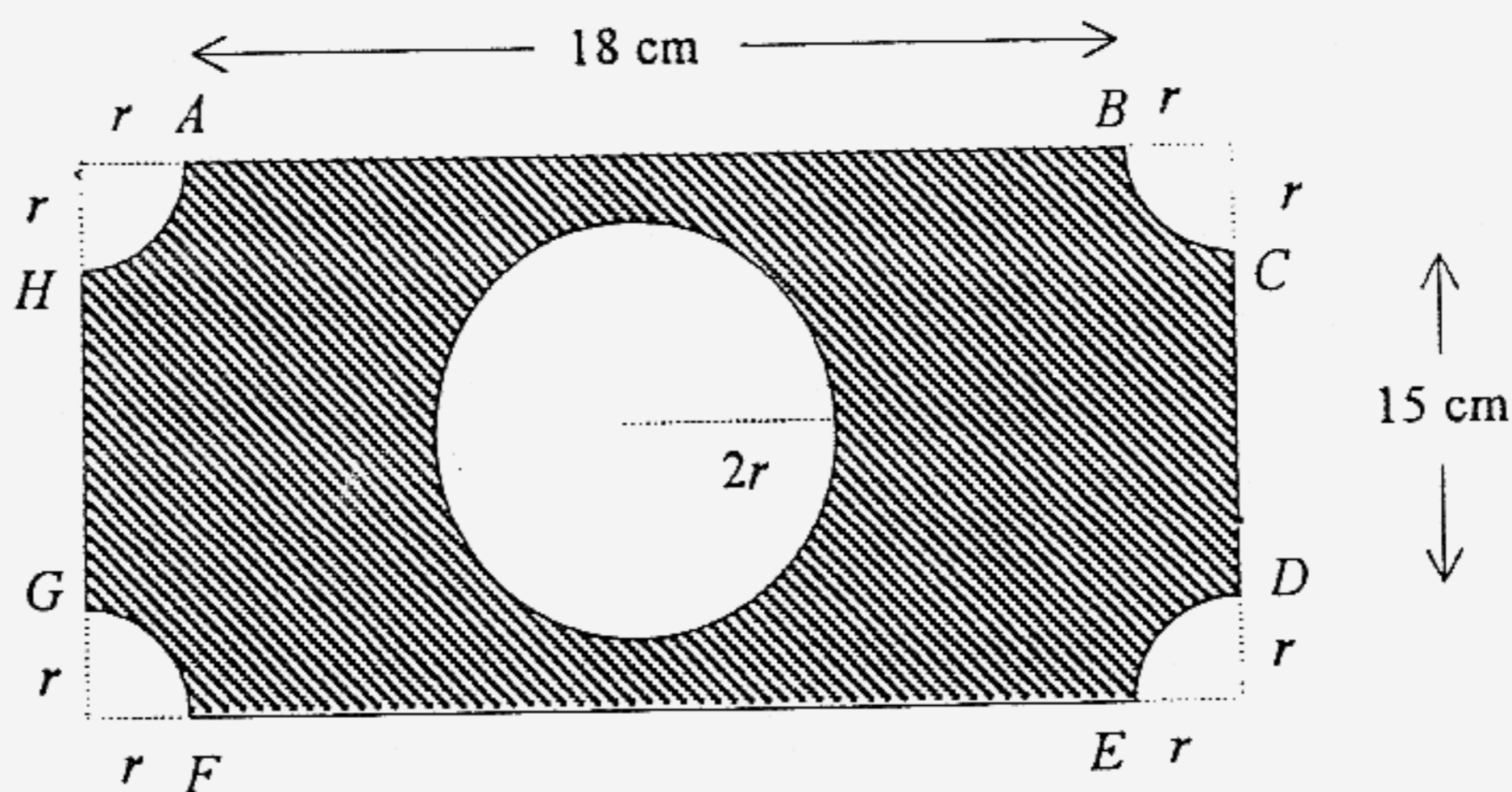
(a)   Write an expression, in terms of r, the total area that has been cut off.   [1]

(b)   Given that the metal plate *ABCDEFGH* has an area of 240 cm^2, form an equation and show that it reduces to $41r^2 - 231r - 105 = 0$.   [2]

(c)   Solve the equation $41r^2 - 231r - 105 = 0$ to find the value of r.   [3]

Hence, find the perimeter of the metal plate.   [2]

7   The diagram below shows the speed-time graphs of a train and a bus during a period of T seconds where the bus travels at a constant speed of 27.5 m/s throughout the journey.
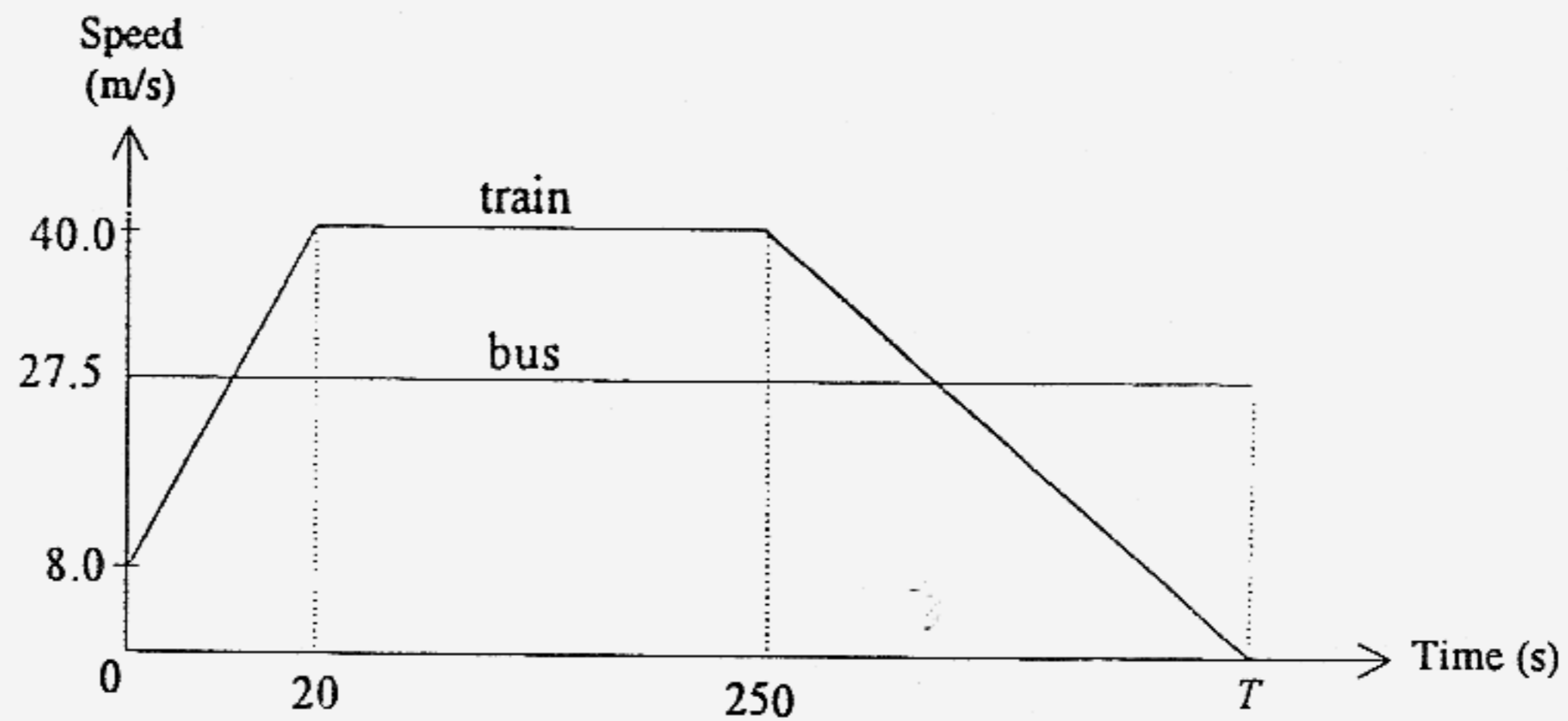
(a)   Calculate the acceleration of the train in the first 20 seconds.   [1]

(b)   Given that the rate at which the train slows down after $t = 250$ seconds is equal to half the rate at which it accelerates during the first 20 seconds, calculate the time, T, at which it stops.   [3]

(c)   Calculate the distance travelled by the train after 100 seconds.   [2]

(d)   The train overtakes the bus at t seconds for $20 < t < 250$, find the value of t.   [4]

(e)   Sketch the acceleration-time graph of the train for the journey.   [2]

8 **Answer the whole of this question on a sheet of graph paper.**

The table below shows the masses, x, of 320 students of a school.

Mass (x kg)	$35 \leq x < 45$	$45 \leq x < 55$	$55 \leq x < 65$	$65 \leq x < 75$	$75 \leq x < 85$
Frequency	42	57	85	71	65

(a) State the modal class. [1]

(b) Calculate the mean mass of the students. [3]

(c) Using a horizontal scale of 2 cm to represent 10 kg and a vertical scale of 2 cm to represent 10 students, draw a histogram for the frequency distribution. [2]

(d) One the same axes, draw a frequency polygon to represent the data. [2]

---

9 **(a)** The points P and Q are (-6, 1) and (3, 13) respectively.

Find
   (i) the gradient of the line PQ, [2]
   (ii) the equation of the line PQ, [2]
   (iii) the coordinates of the mid-point of PQ, [2]
   (iv) the distance of PQ. [2]

(b) A line $y = mx$ meets the curve $y = x(6 - x)$ at A (4, y).

   (i) State the equation of the line of symmetry of the curve. [1]
   (ii) Find the value of y and of m. [3]

---

10   **(a)**   In the diagram, $\angle AED = \angle ACB = 90°$ and $AE = AC$
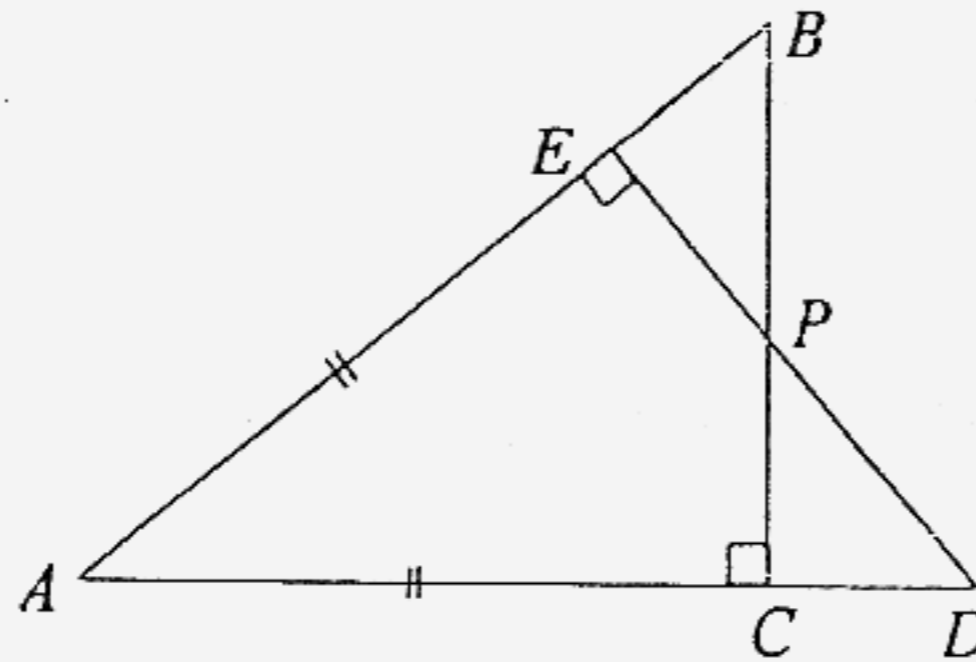
     (i)   Name a pair of congruent triangles and state the reason.   [2]

     (ii)   If $\angle CAE = 35°$, find $\angle CPD$.   [1]

   (b) ABC is a triangle with points X and Y on AB and AC respectively. $AX = 4$ cm, $XB = 28$ cm, $XY = 6$ cm and $AY = YC = 8$ cm.
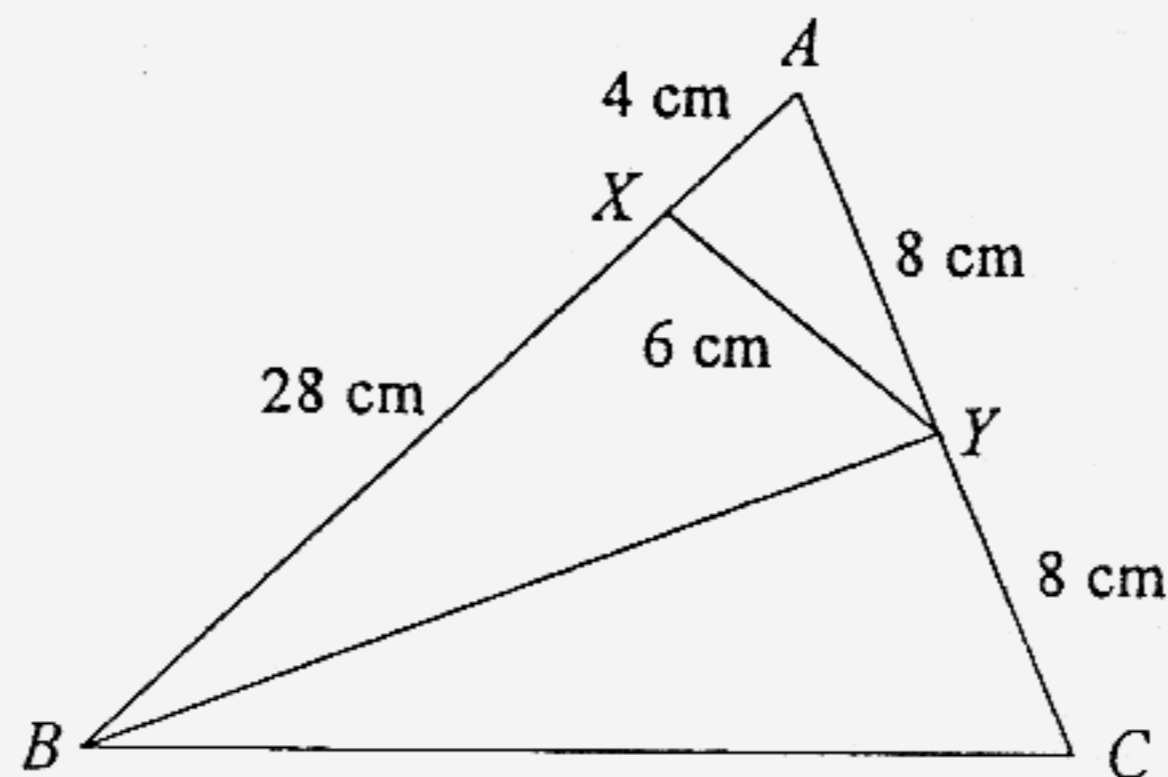
     (i)   Show that triangles ABC and AYX are similar.   [3]

     (ii)   Find the length of BC.   [2]

   (c)   The volumes of two geometrically similar spherical steel balls are $V_1 = 512$ cm^3 and $V_2 = 1728$ cm^3 respectively.

     (i)   Find the ratio of their diameters, $d_1 : d_2$.   [2]

     (ii)   Find the ratio of their surface areas, $A_1 : A_2$.   [2]

     (iii)   If the mass of the larger ball is 12 kg, find the mass of the smaller ball.   [2]

Section B [12 marks]

Answer **one** question in this section.

11 **Answer the whole of this question on a sheet of graph paper.**

The variables x and y are connected by the equation $y = \dfrac{1}{20}\left(225 - 2x^2 - \dfrac{72}{x}\right)$.

Some of the corresponding values of x and y are given in the table below:

x	0.5	1	2	3	4	6	8	10	12
y	4.0	7.6	9.1	a	8.8	b	4.4	0.9	-3.5

(a) Find the value of a and of b, correct to 1 decimal place. [2]

(b) Using a scale of 1 cm to represent 1 unit on both axes, plot the graph of

$y = \dfrac{1}{20}\left(225 - 2x^2 - \dfrac{72}{x}\right)$ for $0.5 \le x \le 12$. [3]

(c) Use the graph to estimate the values of

  (i) y when $x = 5$. [1]

  (ii) x when $y = 5$. [2]

(d) By adding another line to your graph, find the solutions of the equation

$$10 + 25x = \left(225 - 2x^2 - \frac{72}{x}\right).$$ [2]

(e) By drawing a tangent, estimate the gradient of the curve at $x = 8$. [2]

12
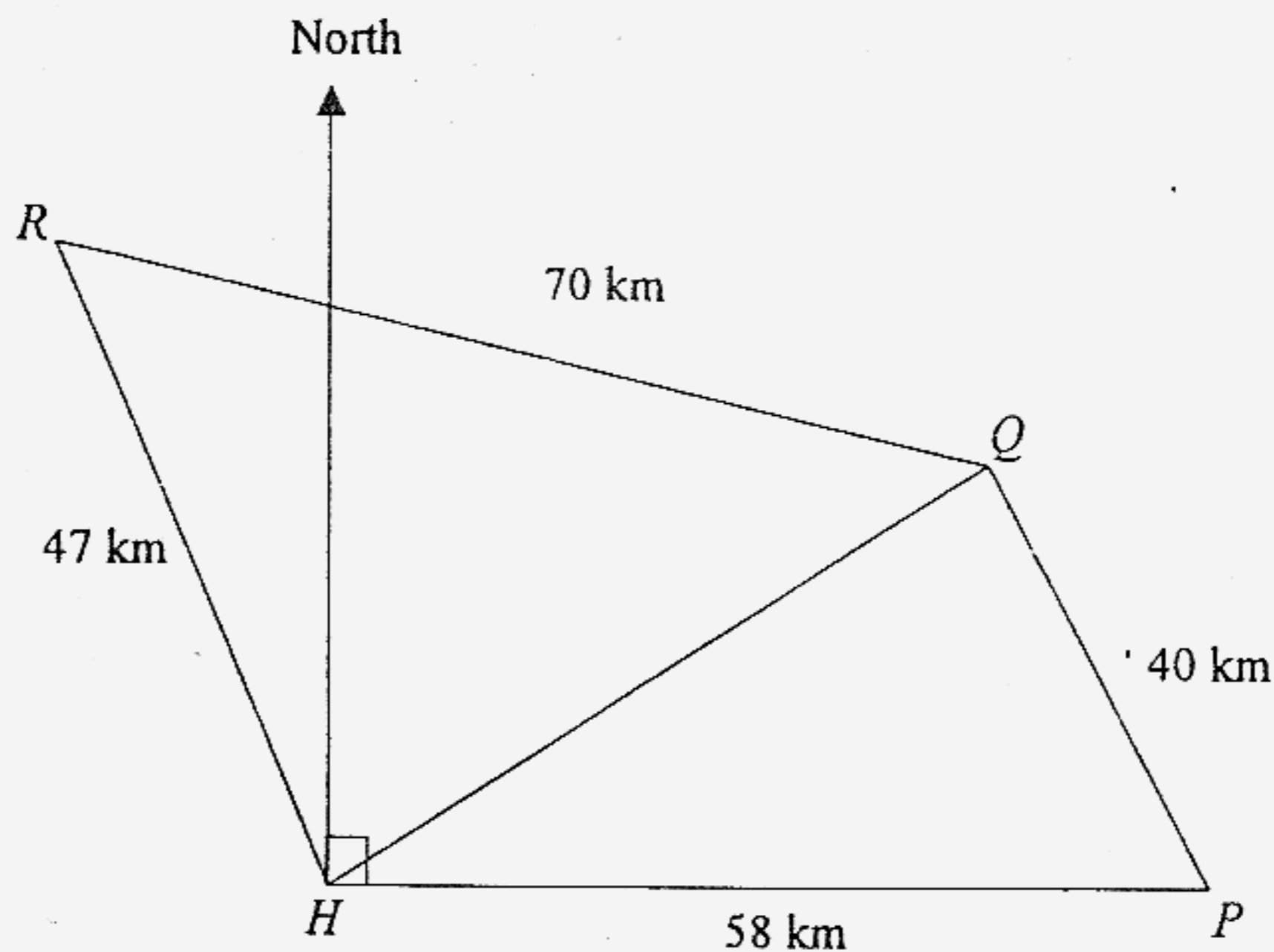
A harbour H and an oil rig P are 58 km apart with P due east of H. A supply ship leaves H for a second oil rig Q which is 40 km from P. The bearing of Q from H is 048°.

Find

(a) $\angle HQP$,   [2]

(b) the bearing of Q from P,   [1]

(c) the area of $\triangle HPQ$.   [2]

A seaside resort R is situated west of the line HQ. R is 47 km and 70 km from H and Q respectively.

(d) Calculate the $\angle HQR$.   [3]

(e) What is the shortest distance from R to HQ?   [2]

(f) The supply ship leaves H at 11 15. It sails directly to R, where it stays for 45 minutes, then returns to H.

Assumed that it travels at a constant speed of 20 km/h, at what time does it return to H?   [2]

~~~ *End of Paper* ~~~

S/No	Answer	Marks	Remarks
1. (a)	2.00		
(b)	0.55		
(c)	375%		
(d)	$1\dfrac{1}{15}$		
2. (a)	$\sqrt{480000} = \sqrt{48} \times \sqrt{10000}$ $\qquad\qquad = 6.93 \times 100$ $\qquad\qquad = 693$		
(b)	$\sqrt{0.00000480} = \sqrt{4.80} \times \sqrt{1 \times 10^{-6}}$ $\qquad\qquad\quad = 2.19 \times 10^{-3}$		
(c)	$\sqrt{120} = \sqrt{4.80} \times \sqrt{25}$ $\qquad\quad = 2.19 \times 5$ $\qquad\quad = 10.95$		
3.	$f = \dfrac{1}{2}\sqrt{\dfrac{T}{m}}$ $f^2 = \dfrac{1}{4}\left(\dfrac{T}{m}\right)$ $T = 4f^2 m$		
4a	$72km/h = \dfrac{72 \times 1000}{3600}$ $\qquad\qquad = 20 \text{ m/s}$		

4b	$y = \dfrac{k}{x^2}$ When $y = 5$, $x = 4$, $5 = \dfrac{k}{4^2}$ $k = 80$ When $x = 10$ $y = \dfrac{80}{10^2} = \dfrac{4}{5}$		
5. (a)	$\dfrac{5x}{x^2 + x - 6} - \dfrac{2}{x-2} = \dfrac{5x}{(x+3)(x-2)} - \dfrac{2}{x-2}$ $= \dfrac{5x}{(x+3)(x-2)} - \dfrac{2(x+3)}{(x+3)(x-2)}$ $= \dfrac{5x - 2x - 6}{(x+3)(x-2)}$ $= \dfrac{3(x-2)}{(x+3)(x-2)}$ $= \dfrac{3}{x+3}$		
5. (b)	$x + 3 = \dfrac{8}{3-x}$ $9 - x^2 = 8$ $x^2 - 1 = 0$ $x = 1$ or -1		
6. (a)	$\angle XYZ = 90° + 46°$ $\qquad\quad = 136°$		
(b)	Bearing of Y from Z $= 360° - (180° - 46°)$ $\qquad\qquad\qquad = 226°$		

7. (a)	$4^{\frac{3}{2}} \times 27^{\frac{2}{3}} \times 5^0 = (2^2)^{\frac{3}{2}} \times (3^3)^{\frac{2}{3}} \times 1$		
	$\qquad = 2^3 \times 3^2 \times 1$		
	$\qquad = 72$		
7. (b)	$\dfrac{4x^2 y^3}{3z^4} \div \dfrac{2x^4 y^2}{9yz^2} = \dfrac{4x^2 y^3}{3z^4} \times \dfrac{9yz^2}{2x^4 y^2}$		
	$\qquad = \dfrac{6y^2}{x^2 z^2}$		
8. (a)	$\dfrac{2q}{p} = \dfrac{2 \times 3 \times 10^9}{5 \times 10^8}$		
	$\qquad = 1.2 \times 10$		
8. (b)	$q - p = 3 \times 10^9 - 5 \times 10^8$		
	$\qquad = 3 \times 10^9 - 0.5 \times 10^9$		
	$\qquad = 2.5 \times 10^9$		
9	$6p - 7q = 16$ --------(1)		
	$\dfrac{3}{5}p + \dfrac{1}{2}q = 4$ ---------(2)		
	$(2) \times 10:\ 6p + 5q = 40$ ----------(3)		
	$(1) - (3):\ -12q = -24$		
	$\qquad q = 2$		
	from (1): $6p - 7(2) = 16$		
	$\qquad 6p = 30$		
	$\qquad p = 5$		
10. (a)	$BC = \sqrt{6^2 + 8^2} = 10$ cm		
bi	4/5		
bii	- 3/4		
biii	4/5		
11. (a)	1 house:		
	12 men – 12 days		
	2 houses:		

	24 men – 12 days To build 2 houses in 9 days, you need $= 24 \times \dfrac{12}{9}$ $\qquad\qquad = 32$ men		
11 (b)	Total sum after 2 years $= \$1000 \times 2(0.05) + 1000$ $\qquad\qquad\qquad\qquad = \$1100$		
12 (a) (b)	Length on a map $= \dfrac{13 \times 100 cm}{50}$ $\qquad\qquad\quad = 26$ cm 1 cm : 0.5 m 1 cm^2 : 0.5^2 m^2 1 cm^2 : 0.25 m^2 200 cm^2 $= 0.25 \times 200$ $\qquad\quad = 50$ m^2		
13. (a) (b) (c)	Smallest $x + y = -1 + 2 = 1$ Largest $\dfrac{2x}{y} = \dfrac{2(8)}{2}$ $\qquad\qquad = 8$ Smallest $3x^2 + 3y^2 = 3(0)^2 + 3(2)^2$ $\qquad\qquad\qquad\quad = 12$		
14. (a) (b) (c)	$m = -6$ $A = (0, 15)$, $B = (2\frac{1}{2}, 0)$ $x = 2\frac{1}{2}$		
15. (a) (b) (c)	4 28 Mean $= \dfrac{0 \times 4 + 1 \times 7 + 2 \times 3 + 6 \times 3 + 8 \times 4}{28}$ $\qquad\quad = 2.25$ books		
16 (a)	$\angle OBA = \dfrac{180° - 76°}{2} = 52°$ (base angles of iso. triangle)		

(b)	$\angle RBA = 90° - 52° = 38°$ (tangent perpendicular to radius)		
(c)	Angle BOC = 180° − 76° $\qquad = 104°$ Angle OBC = (180° − 104°) x 0.5 (triangle BOC is an isosceles triangle) $\qquad = 38°$ Angle OBD = 38° − 18° $\qquad = 20°$ Angle ADB = 38° (angle at centre is double angle at the circumference) Angle CAD = 18° (angles made by the same chord at the circumference are equal) Angle ASD = 180° − 38° -18° (sum of angle in triangle = 180°) $\qquad = 124°$ Angle DSC = 180° − 124° (angle on a straight line = 180°) $\qquad = 56°$		
17	$\angle AOB = 60°$ (triangle AOB = equilateral triangle) Length of arc CD $= 2 \times \dfrac{22}{7} \times 7 \times \dfrac{\theta}{360}$ $\dfrac{11\theta}{90} = 8.8$ $\theta, \angle COD = 72°$ $\angle BOC = 180° − 72° − 60°$ $\qquad = 48°$ Ratio of shaded region : ratio of semi-circle $\quad$ = ratio of angle COD : 180-degrees $\quad$ = $\quad$ 48 : 180 $\quad$ = $\dfrac{4}{15}$ (or 4 : 15)		
(a)	Both triangles share common angle $\angle BAE$ $\angle ABE = \angle ACD$ $\angle AEB = \angle ADC$ By AAA properties, triangle ABE is similar to triangle ACD.		

18 (b)i	$\dfrac{8}{11}$		
18(b)ii	$\dfrac{\text{Area of triangle ABE}}{\text{Area of triangle ACD}} = \dfrac{(8)^2}{(11)^2} = \dfrac{64}{121}$		
(b)iii	$\dfrac{\text{Area of triangle ABE}}{\text{Area of quadrilateral BCDE}} = \dfrac{64}{121-64}$ $= \dfrac{64}{57} = 1\dfrac{7}{57}$		
19(a)	when x = 0, $\quad$ y = a(0) + b(0) + c $\quad$ c = -8 when y = 0, x-intercepts are (-2, 0) and (4, 0) $\quad$ 0 = (x + 2) (x – 4) $\quad$ $x^2 -2x – 8 = 0$ by observation, a = 1, b = -2, c = -8		
(b)	$y = x^2 -2x -8$ At $(5, k)$: $k = 5^2 – 2(5) – 8$ $\quad$ k = 7		
20 (a)	a = 13 b = 49		
(b)	$2n – 1$		
(c)	$M = \left(\dfrac{L+1}{2}\right)^2$		

CHIJ ST JOSEPH'S CONVENT

SECOND SEMESTRAL EXAMINATION 2006

Secondary Three (Express)   ELEMENTARY MATHEMATICS (PAPER 2)   Duration: 2.5 hour

11 OCT 2006

Answer Key:

Q1:   (a) $d = kt^2$

       (b) $k = 8$

       (c)   distance = 288 m

Q2:   (a) $-11 < x < 9$

       (b) $x = 2y$; 1.2

Q3:   (a)   11,250 cm^3

       (b)   10.8 cm

       (c)   5,625 cm^3

       (d)   35.8°

       (e)   14.6 cm

Q4:   (a)   22°

       (b)   56°

       (c)   34°

       (d)   124°

Q5:   (a) $200

       (b) $980

       (c)(i)   USD 1,600

       (c)(ii)   Cheaper to buy in Singapore.

       (c)(iii)   S$1 = USD 0.658, Lionel's rate is better.

Q6:   (a) $5\pi r^2$

       (b) $4lr^2 - 231r - 105 = 0$ (Show); r = 6.06 or -0.423 (n.a.)

            Perimeter = 180 cm

Q7: (a)   1.6 m/s^2

      (b) $\cdot$ 300 s

      (c)   7000 m (or 3680 m depending on interpretation)

      (d)   25.6 s

      (e)   Sketch the acceleration-time graph.

Q8: (a) $55 \leq x < 65$

      (b)   61.9 kg

      (c)   Draw a histogram & frequency polygon for the frequency distribution.

Q9: (a)(i) Gradient $= 1\dfrac{1}{3}$

      (ii) $y = 1\dfrac{1}{3}x + 9$

      (iii)   (-1.5, 7)

      (iv)   Distance = 15

      (b)(i) .3;   (ii)   2

Q10: (a)(i) $\triangle AED \equiv \triangle ACB$ (By AAS)

      (ii) $\angle CPD = 35°$

      (b)(i) $\angle A$ is common, $\dfrac{AY}{AB} = \dfrac{1}{4}$, $\dfrac{AX}{AC} = \dfrac{1}{4}$.

      (ii) 24

      (c)(i) 2:3   (ii) 4:9   (iii) 3.56 kg

Q11: (a) $a = 9.2, b = 7.1$

      (b)   Draw the curve.

      (c)(i)   8 ($\pm$0.1)

      (ii) 0.6 or 7.6 ($\pm$0.1)

      (d)   Draw $y = \dfrac{1}{2} + \dfrac{5}{4}x$; x=5.6 ($\pm$0.1)

Q12: (a)   76.0°

      (b)   332°

      (c)   1020km^2

      (d)   42.2°

      (e)   47.0 km

      (f)   16 24 (24hr-format)