NAME: ______________________ REG NO: (   ) CLASS: SEC 2 /

TEMASEK SECONDARY SCHOOL
FINAL TERM EXAMINATION 2006

MATHEMATICS
PAPER 1

6 October 2006 TIME 1 hour

SECONDARY TWO EXPRESS

INSTRUCTIONS TO PUPILS

Write your name, register number and class in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

If working is needed for any question, show it clearly in the space below that question.

Omission of essential working will result in loss of marks.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER.

INFORMATION FOR PUPILS

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

The total of the marks for this paper is **40**.

If the degree of accuracy is not specified in the question and if the answer is not exact, the answer should be given to **three** significant figures. Answers in degrees should be given to **one** decimal place.

FOR EXAMINER'S USE
/ 40

This question paper consists of 8 printed pages (including this cover page).

Pupils answer on the question paper.
No additional materials are required.

[Turn over]

Paper 1 (40 marks)
Answer all the questions in this section
No calculator allowed.

1. Evaluate the following:

(a) $\left(2\frac{1}{3}-1\frac{2}{5}\right)\div 9\frac{1}{3}$

(b) $1.6^2 + 1.6 \times 0.4$

Answers : (a) _____ [1]

(b) _____ [1]

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2. (a)(i) Express 6394.08 in 2 significant figures.

(ii) Express 0.2458 in 2 significant figures.

(b) Hence, estimate the value of $\frac{\sqrt{6394.08}}{0.2458}$.

Answers : (a)(i) _____ [1]

(ii) _____ [1]

(b) _____ [1]

3. (a) Express 252 as a product of its prime factors.
(b) Hence, or otherwise, find the smallest possible value of n if $252n$ is a perfect square.

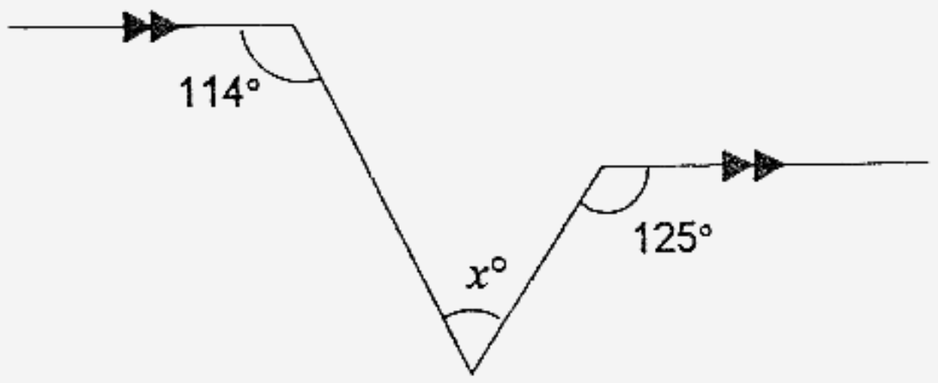
Answers : (a) 252 = _____ [1]

(b) Smallest possible value of n = _____ [1]

4. In a factory, 60 workers took 4h to make 450 bags. How long will the 40 workers take to make 900 bags? (Leave your answer in hours)

Answer : _____ h [2]

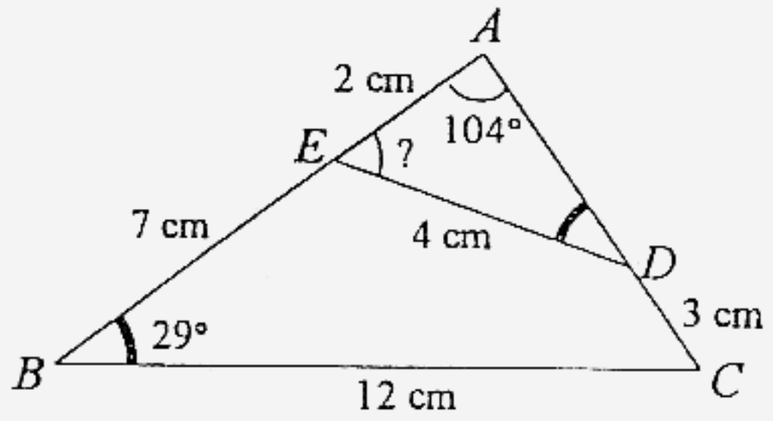
5. Find the value of the unknown, x.



Answer : x = _____ [2]

6. In the diagram below, ΔABC is similar to ΔADE. $AE = 2$ cm, $BE = 7$ cm, $DE = 4$ cm, $BC = 12$ cm, $DC = 3$ cm, $\angle EAD = 104°$ and $\angle ABC = 29°$.

(a) Find $\angle AED$.
(b) Calculate the length of AD.



Answers : (a) $\angle AED =$ _____ [1]

(b) $AD =$ _____ cm [2]

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7. There are 240 adults and 160 children at the cinema watching a movie. $\frac{5}{8}$ of the adults and 50% of the children are male. If one person left the cinema before the movie ends, what is the probability that the person is
(a) an adult,
(b) a man,
(c) a girl,
(d) female?

Answers : (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

(d) _____ [1]

8. The scale of a map is 2 cm to 5 km.

(a) Calculate, in km, the actual distance between 2 towns which are 6.4 cm apart on the map.

(b) Calculate, in cm^2, the area of a field on the map if the actual field has an area of 50 km^2.

(c) Express the scale of the map in the form of 1 : n.

Answers : (a) _____ km [1]

(b) _____ cm^2 [2]

(c) _____ [1]

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9. Solve the following simultaneous equations.

$$3x + 7y - 1 = 0$$
$$2x = 3y + 16$$

Answers : $x =$ _____, $y =$ _____ [3]

10. (a) Simplify $\frac{3a^2b}{8ab^3} \div \frac{21ac^4}{49ab^2c^3}$

(b) Simplify $\frac{3}{x+2} + \frac{12}{x^2-4}$.

Answers : (a) _____ [1]

(b) _____ [3]

11. A six-sided dice is thrown 49 times. The results are recorded in the table below:

Number shown on dice	1	2	3	4	5	6
Frequency	9	15	7	8	7	3

(a) From the results, write down
(i) the mode,
(ii) the median.

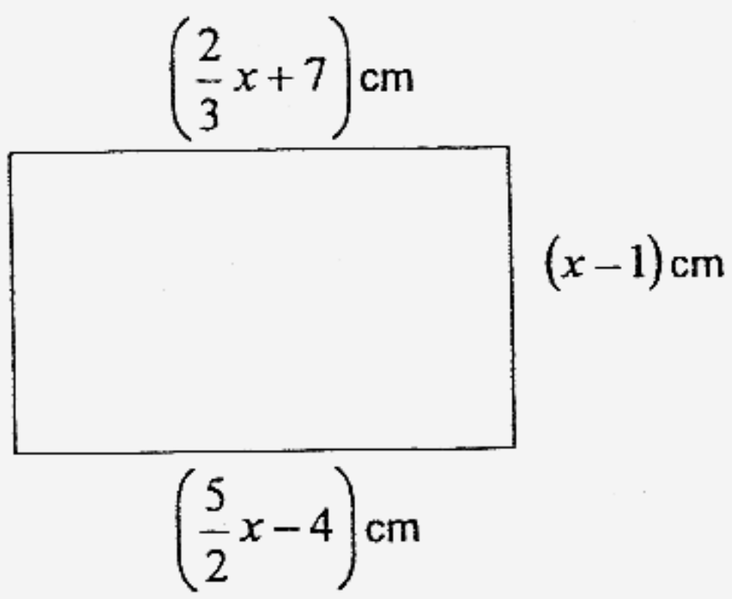
(b) The dice is thrown one more time. Find the number shown on the dice if the mean of the 50 throws is to be exactly 3.

Answers : (a)(i) _____ [1]

(ii) _____ [1]

(b) _____ [2]

12. The diagram below shows a rectangle.



(a) Find the value of x.

(b) Hence, find the area of the rectangle.

Answers : (a) $x =$ _____ [2]

(b) _____ cm^2 [1]

13. Of the 40 students in a class, 25 like Geography and 20 like Literature. It is given that

$\varepsilon =$ Students in the class
$G =$ Students who like Geography
$L =$ Students who like Literature

(a) Express in set notation to illustrate the statement "There are students who like Geography but do not like Literature".

(b) Let $n(G \cap L) = x$.

(i) Express $n(G \cup L)$ in terms of x.

(ii) Find the smallest possible value of x.

(iii) Find the largest possible value of x.

Answers : (a) _____ [1]

(b)(i) _____ [1]

(ii) _____ [1]

(iii) _____ [1]

------ *end of paper* ------

TEMASEK SECONDARY SCHOOL
FINAL TERM EXAMINATION 2006

MATHEMATICS
PAPER 2

6 October 2006 **TIME 1 hour 15 minutes**

SECONDARY TWO EXPRESS

INSTRUCTIONS TO PUPILS

Write your name, register number, class, calculator's make and model in the spaces provided on the cover page.

Write your answers on the separate writing paper provided.

All necessary working must be shown clearly.

Omission of essential working will result in loss of marks.

Section A

Answer **all** questions.

Section B

Answer **ONE** question.

INFORMATION FOR PUPILS

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

The total of the marks for this paper is **50**.

If the degree of accuracy is not specified in the question and if the answer is not exact, the answer should be given to **three** significant figures. Answers in degrees should be given to **one** decimal place.

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

This question paper consists of 7 printed pages (including this cover page).

Additional materials: Writing paper (4 sheets)
Graph paper (1 sheet)
Plain paper (1 sheet)
Cover page (1 sheet)

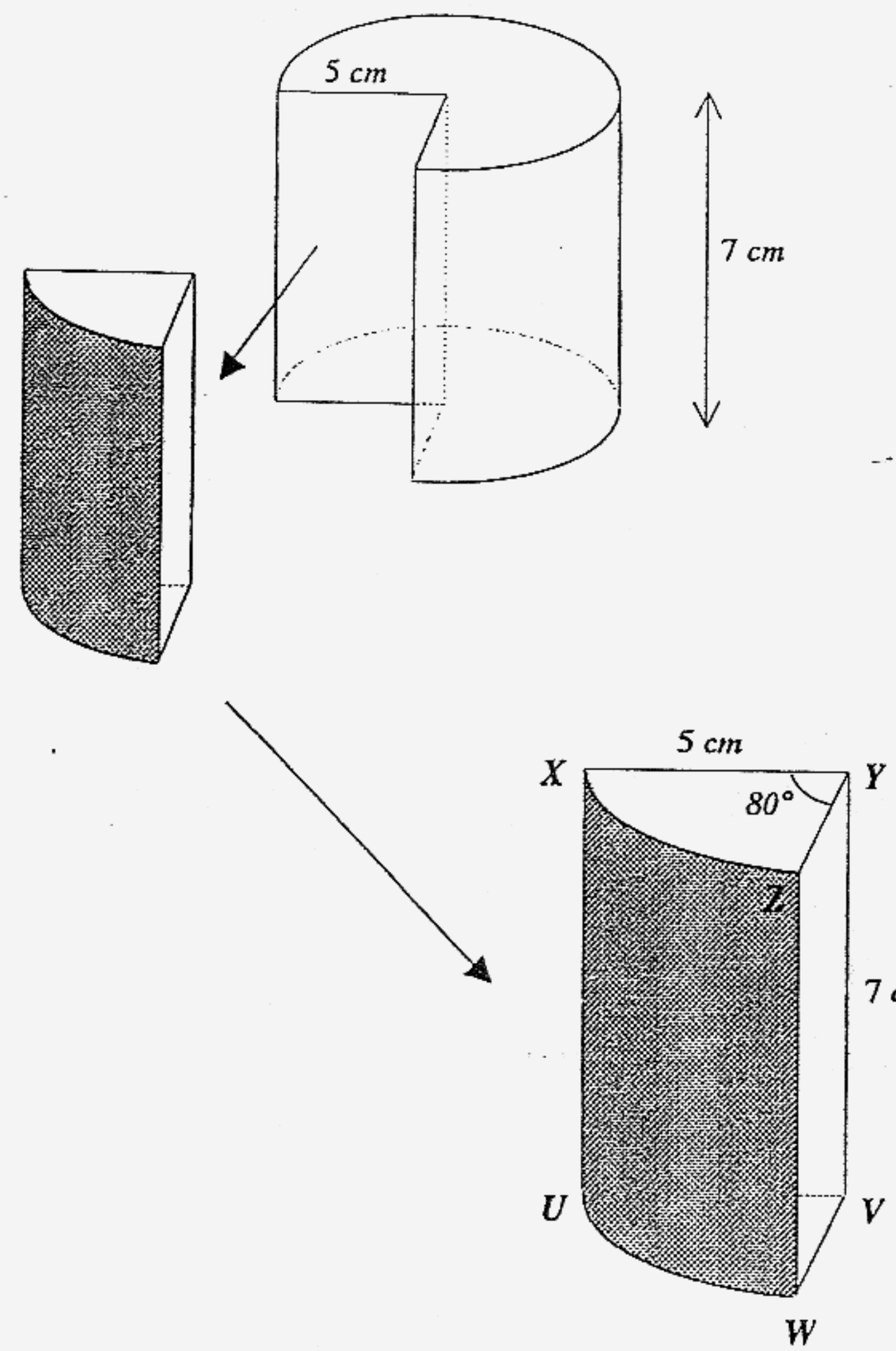
Section A (40 marks)
Answer ALL the questions in this section.

1. (a) Factorise $(a^3 - ab^2) + (a^2b - b^3)$. [3]

   (b) Expand and simplify $(x-1)(x^2+4x+4)$. [2]

2. A class of 40 students took a Mathematics test. 8 students passed the test **with** Distinction while 20 students passed the test **without** Distinction. Let P be the set of students who passed the test, and D be the set of students who passed with Distinction. Show the sets P and D in a Venn diagram. Hence, find n (students who failed the Mathematics test). [4]

3. The figure below shows a minor section cut out from a cylinder with radius 5 cm and height 7 cm.

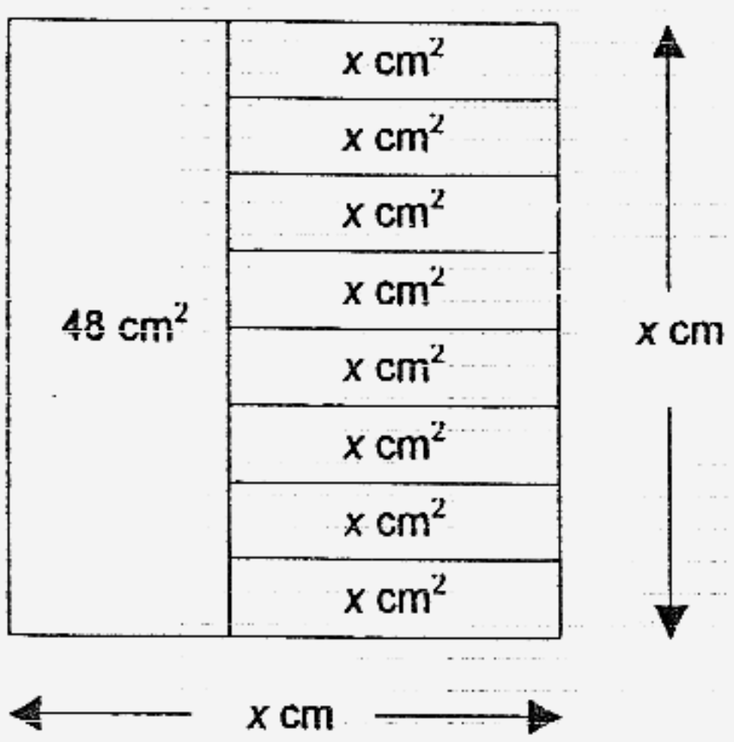


Given that $\angle XYZ = 80°$, calculate the

(i) volume of the minor section, [2]

(ii) area of curved surface $XZWU$. [3]

4. In the diagram below, a square of side x cm is made up of a rectangle of area 48 cm^2 and eight identical rectangles of area x cm^2 each. Form an equation in x and solve it. [4]

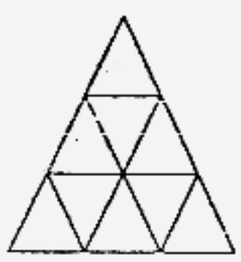


5. In a bag of coins, the ratio of the number of 10 cent, 20 cent and 50 cent coins in the bag is 3 : 5 : 1.

(a) If a pie chart is drawn to show the information, calculate the angle of the sector representing the number of 20 cent coins. [2]

(b) Calculate the least possible amount of money in the bag. [1]

6. Consider the first three shapes of a sequence formed using matchsticks in the diagram below:

		No. of △s formed	No. of matchsticks used
N =1		1	3
N =2		4	9
N =3		9	18

(a) Calculate the number of △s formed when N = 23. [1]

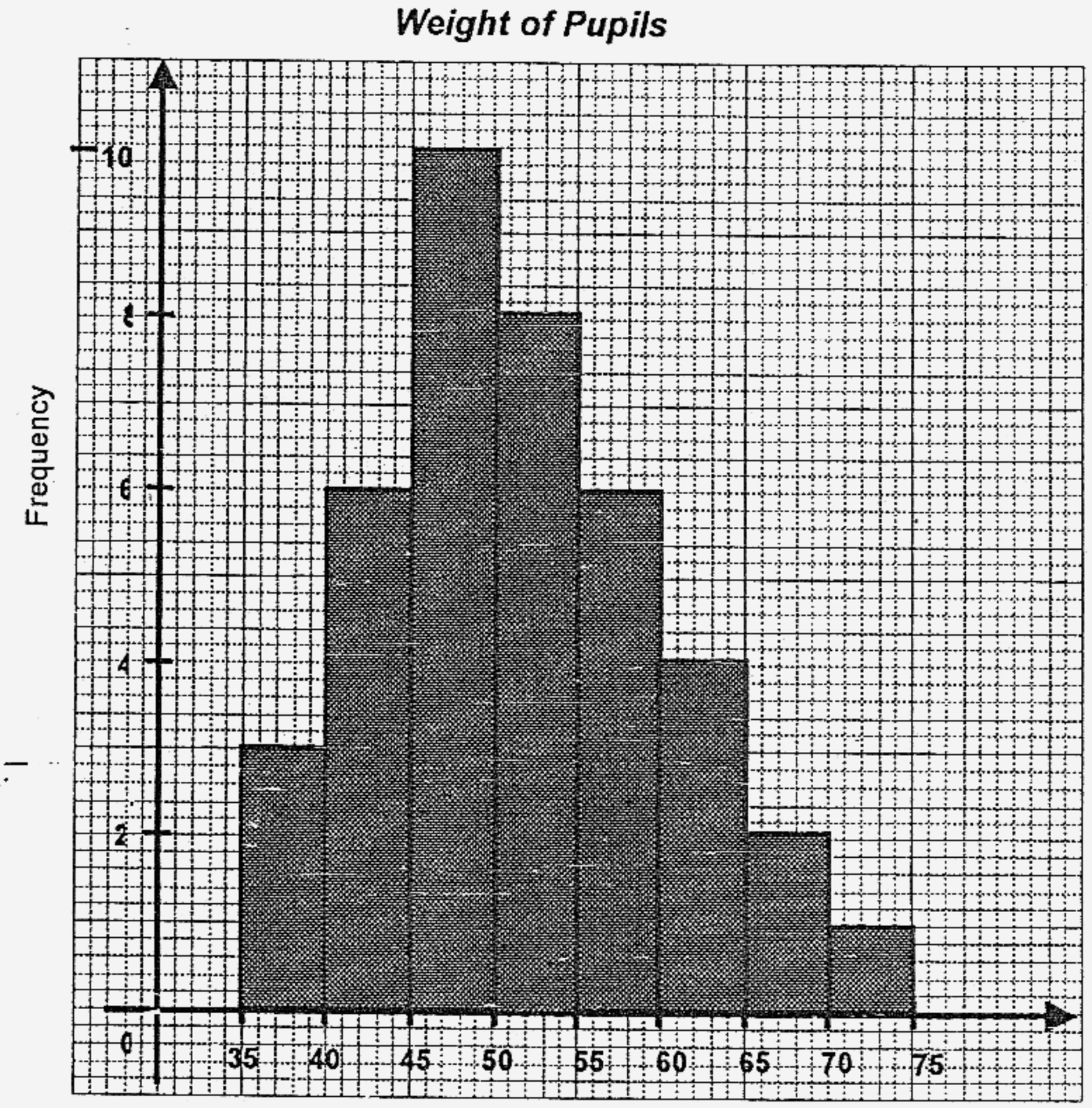
(b) (i) Write down the number of matchsticks used when N = 4. [1]

(ii) Let T = total number of matchsticks used for each shape.

By considering N and the number of △s formed, find a formula for T in terms of N. [2]

7. The weight of each pupil in a class is represented in the table and illustrated in the histogram below:

Weight (x kg)	Frequency
$35 < x \leq 40$	3
$40 < x \leq 45$	6
$45 < x \leq 50$	a
$50 < x \leq 55$	8
$55 < x \leq 60$	6
$60 < x \leq 65$	b
$65 < x \leq 70$	2
$70 < x \leq 75$	c

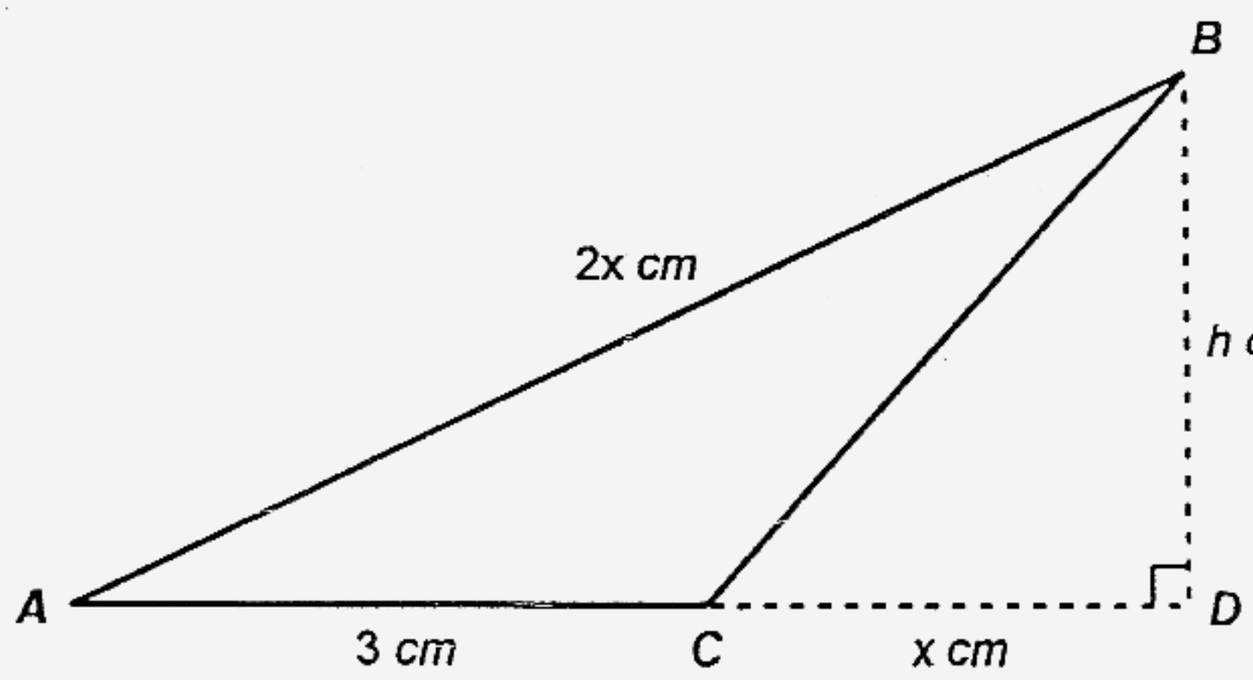


(a) Write down the values of a, b and c. [1]

(b) Find the total number of pupils in the class. [1]

(c) If pupils with weight 40 *kg* and below and pupils with weight above 65 *kg* are enrolled in the TAF programme, calculate the percentage of pupils in the class enrolled in the TAF programme. [2]

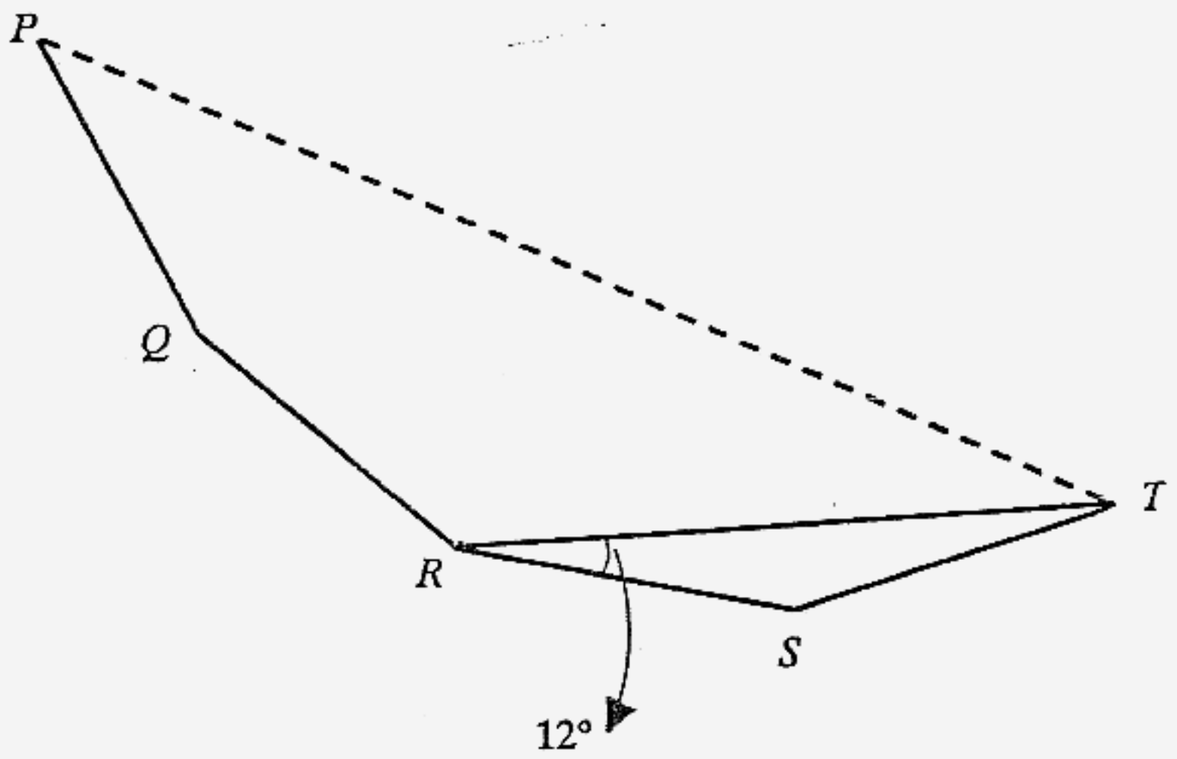
8. In the diagram below, $AB = 2x$ *cm*, $AC = 3$ *cm*, $CD = x$ *cm* and $BD = h$ *cm*.



(a) Given that area of $\Delta ABC = 9\ cm^2$, write down a pair of simultaneous equations involving h and x. [2]

(b) Solve the equations to find the values of h and x.
Write down the length of AB. [4]

9. P, Q, R, S and T are adjacent vertices of a regular n-sided polygon.



Given that $\angle SRT = 12°$, calculate

(a) the size of an exterior angle of this polygon, [1]

(b) n, [2]

(c) $\angle QPT$. [2]

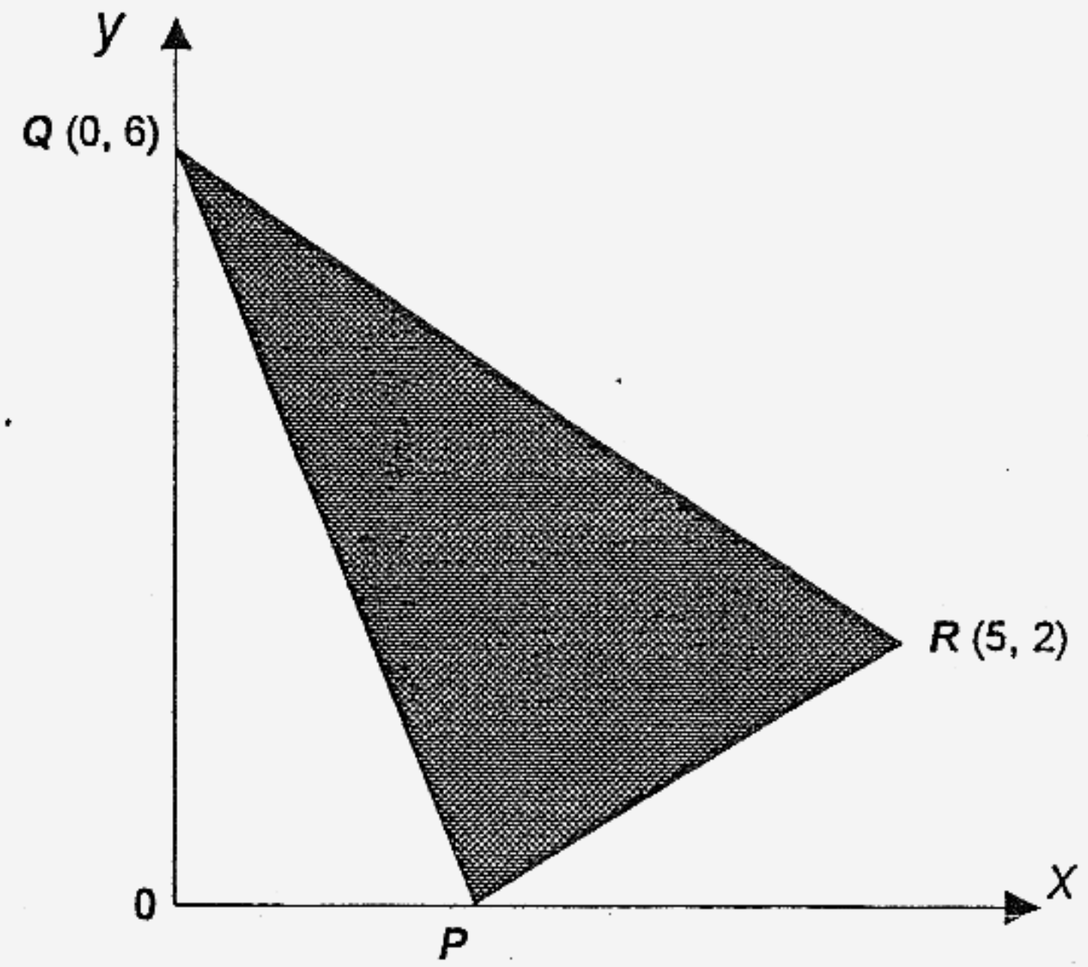
----- End of Section A -----

Section B (10 marks)
Answer only ONE question from this section.

EITHER

Answer the whole of this question on a sheet of plain paper.

10a. In the diagram below, the coordinates of Q and R are (0, 6) and (5, 2) respectively. The line PQ cuts the x- and y-axis at P and Q respectively.



(i) (a) Given that the gradient of PR is 0.5, find the equation of line PR. [3]

(b) Write down the coordinates of P. [1]

(ii) If the line $y = 2$ is a line of symmetry for ΔQRS, write down the coordinates of S. [1]

10b. Mr. Shabie leases a plot of land from the government for farming. The land is in the shape of a quadrilateral $PQRS$, where $PQ = 95\ m$, $SR = 65\ m$ and $\angle SPQ = 80°$. SR is parallel to PQ and 70 m away from it.

(a) Using a scale of 1 cm to represent 10 m, construct a plan of the land $PQRS$. [2]

(b) Construct the bisector of $\angle SPQ$ and the perpendicular bisector of PQ. In your diagram, label the point W, which is the point of intersection of the 2 constructed lines. [3]

OR

Answer the <u>whole</u> of this question on a sheet of graph paper.

11. The table below gives some values of x and the corresponding values of y, where $y = 10 + 8x - 2x^2$ for $-2 \leq x \leq 6$:

x	-2	-1	0	1	2	3	4	5	6
y	-14	0	10	16	18	16	***a***	0	***b***

(a) Calculate the values of a and b. [1]

(b) Taking 2 cm to represent 1 unit on the horizontal axis and 2 cm to represent 4 units on the vertical axis, draw the graph of $y = 10 + 8x - 2x^2$ for $-2 \leq x \leq 6$. [3]

(c) From your graph, estimate the
(i) maximum value of y and the corresponding x value. [2]
(ii) value(s) of y when $x = 0.5$ [1]
(iii) value(s) of x when $12 - x - x^2 = 2 - 9x + x^2$. [3]

----- End of Paper -----

Answer Key

1(a) $\frac{1}{10}$ (b) 3.2

2(a)(i) 6 400 (b) 320
(ii) 0.25

3(a) $252 = 2^2 \times 3^2 \times 7$ (b) $n = 7$

4 12 h

5 $x = 59°$

6(a) 47° (b) 3 cm

7(a) $\frac{3}{5}$ (b) $\frac{3}{8}$ (c) $\frac{1}{5}$ (d) $\frac{17}{40}$

8(a) 16 km (b) 8 cm^2 (c) 1 : 250 000

9 $x = 5, y = -2$

10(a) $\frac{7a}{8c}$ (b) $\frac{3}{x-2}$

11(a)(i) 2 (b) 5
(ii) 3

12(a) $x = 6$ (b) 55 cm^2

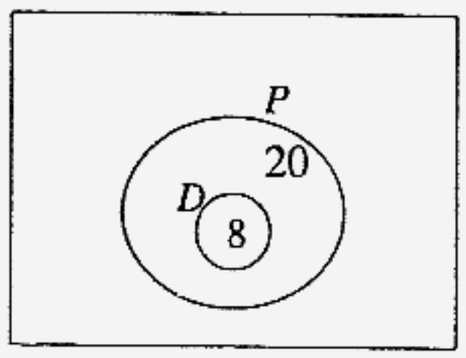
13(a) $G \cap L' = \varnothing$ (b)(i) $45 - x$
(ii) 5
(iii) 20

Answers

1(a) $(a+b)^2(a-b)$

(b) x^3+3x^2-4

2



n(fail) = 12

3 (i) 122 cm^3

(ii) 48.9 cm^2

4 $x^2-8x-48=0$, $x = 12$

5(a) 200^0

(b) \$1.80

6(a) 529

(b)(i) 30

(ii) $T=\frac{3}{2}(N+N^2)$

7(a) $a=10 \quad b=4 \quad c=1$

(b) 40

(c) 15%

8(a) $\frac{3h}{2}=9$; $h^2+(3+x)^2=(2x)^2$

(b) $h = 6$; $x = 5$, $AB = 10$cm

9(a) 24^0

(b) $n = 15$

(c) 36^0

10 Either

(i)(a) $y=\frac{1}{2}x-\frac{1}{2}$

(b) $P(1,0)$

(ii) $S(0,-2)$

10 Or

(a) $a=10 \quad b=-14$

(c) (i) max y = 18 when x = 2

(ii) y = 13.5

(iii) x = -1 or 5