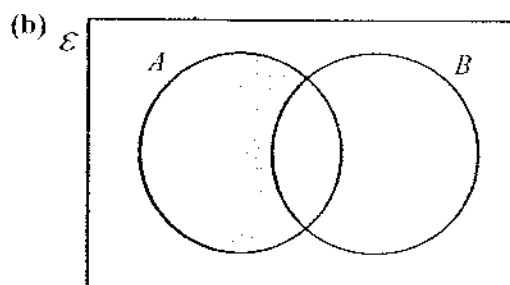
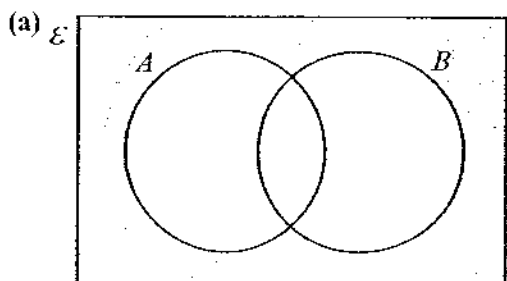


- 1 For each of the diagrams below, express, in set notation, the set represented by the shaded area in terms of A and B .



Answer (a) [1]

(b) [1]

- 2 Each letter of the words 'NATIONAL DAY' is written on individual cards and placed in a box. A card is picked at random from the box.

- (a) Find the probability that the letter N is chosen.
- (b) Find the probability that a vowel is chosen.
- (c) All the cards with the letter 'N' are removed from the box. Find the probability that a consonant is chosen.

Answer (a) [1]

(b) [1]

(c) [1]

- 3 It is given that

$A = \{\text{students who play Rubik's Cube}\}$.

$B = \{\text{students who play Sudoku}\}$.

Express each of the following statements in set language.

- (a) The set of students who play either Sudoku or Rubik's Cube.
- (b) The set of students who play Sudoku but not Rubik's Cube.
- (c) There are 104 students who play both Sudoku and Rubik's Cube.

Answer (a) [1]

(b) [1]

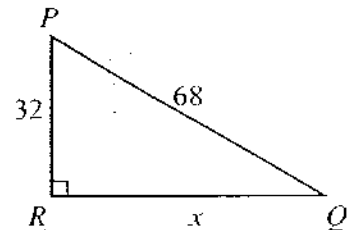
(c) [1]

- 4 y is directly proportional to the square of x . It is given that $y = 1$ when $x = \frac{2}{5}$.
- (a) Find the equation connecting y and x .
- (b) Find the value of y when $x = 0.2$.

Answer (a) [2]

(b) [1]

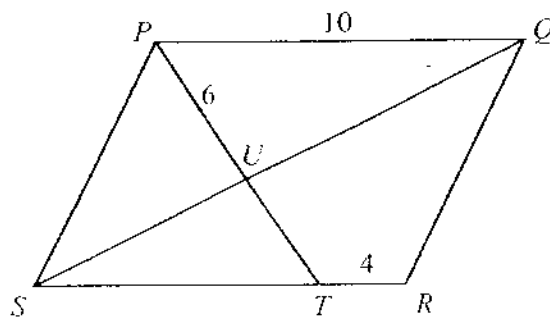
- 5 The figure shows a right-angled triangle PQR . It is given that $PQ = 68$ cm, $PR = 32$ cm and $\angle PRQ = 90^\circ$, evaluate the value of x .



Answer cm [3]

- 6 $PQRS$ is a parallelogram. The lines PT and QS intersect at U . It is given that $PQ = 10$ cm, $TR = 4$ cm and $PU = 6$ cm.

- (a) Name two triangles that are similar.
 (b) Hence find the length of TU .



Answer (a) Δ and Δ [1]
 (b) cm [2]

- 7 Factorise completely

- (a) $25x^2 - 20xy + 4y^2$,
 (b) $25x - 10y$.
 (c) Hence, factorise $25x^2 - 20xy + 4y^2 + 25x - 10y$.

Answer (a) [1]
 (b) [1]
 (c) [1]

- 8 Solve the simultaneous equations

$$\frac{\sqrt{x}}{4} + 3y = 17$$

$$\frac{\sqrt{x}}{8} - y = -4$$

Answer $x = \dots\dots\dots$ $y = \dots\dots\dots$ [3]

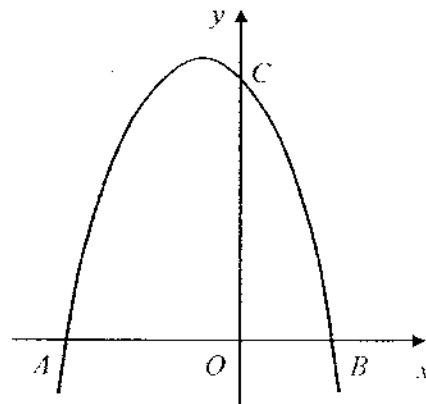
- 9 A map is drawn to a scale of 1 : 30 000.
- (a) Find the actual distance, in km, between 2 towns which is 10.5 cm apart on the map.
- (b) A park covers an area of 8.1 km². Find, in cm², the area representing the park on the map.

Answer (a) $\dots\dots\dots$ km [1]

(b) $\dots\dots\dots$ cm² [2]

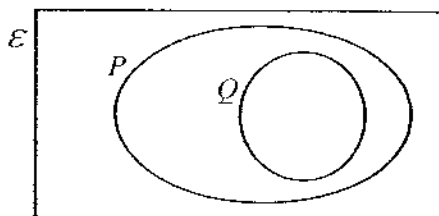
10 The graph of $y = -3x^2 + 63 - 12x$ cuts the x -axis at A and B . It cuts the y -axis at C . Find

- (a) the coordinates of A , B and C ,
- (b) the coordinates of the turning point of the graph.



Answer (a) A (.....)
 B (.....)
 C (.....) [3]
 (b) (.....) [2]

11 (a) On the Venn diagram, shade the set $(P \cap Q)'$.



[1]

(b) A survey is carried out on 60 students to find out the two types of novels they enjoy reading:

x students enjoy Romance novels.

34 students enjoy Mystery novels.

19 students enjoy both Romance and Mystery novels.

5 students do not enjoy reading both types of novels

(i) Draw a Venn diagram to illustrate the above information.

(ii) Find the value of x .

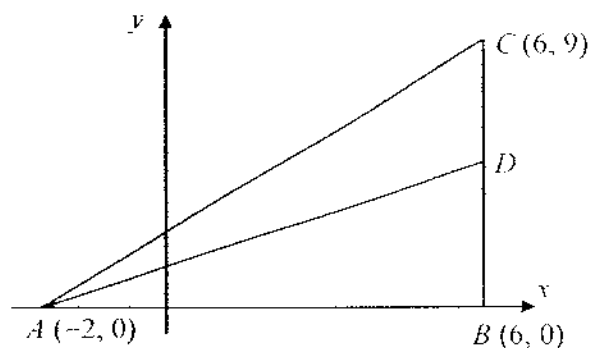
Answer (b) (i)

[3]

Answer (b) (ii) [2]

12 In the diagram, A , B , and C are the points $(-2, 0)$, $(6, 0)$ and $(6, 9)$ respectively. The equation of the line AD is $4y = 3x + 6$, where D lies on BC . Find

- (a) the equation of the line BC ,
- (b) the area of $\triangle ABD$,
- (c) the equation of the line AC .



Answer (a) [1]
 (b) unit² [2]
 (c) [3]

13 (a) Given that $\frac{a}{b} = b\left(2 - \frac{d}{b}\right)$, express b in terms of a and d .

(b) Simplify $\left(\frac{2x-1}{(2x^2-12x+18)} - \frac{x+1}{x^2-3x}\right) \div \frac{x+2}{x}$.

Answer (a) [3]

(b) [4]

End of Part I

Answers for paper 1

1. (a) $(A \cup B)'$ or $A' \cap B'$

(b) $A \cap B'$

2. (a) $\frac{2}{11}$

(b) $\frac{5}{11}$

(c) $\frac{4}{9}$

3 (a) $A \cup B$

(b) $B \cap A'$

(c) $n(A \cup B) = 104$

4 (a) $y = \frac{25x^2}{4}$ or $6.25x^2$

(b) $y = 0.25$ or $\frac{1}{4}$

5 60

6 (a) ΔPQU and ΔTSU

(b) 3.6

7 (a) $(5x - 2y)^2$

(b) $5(5x - 2y)$

(c) $(5x - 2y)(5x - 2y + 5)$

8. $x = 64$, $y = 5$

9 (a) 3.15 km

(b) 90 cm^2

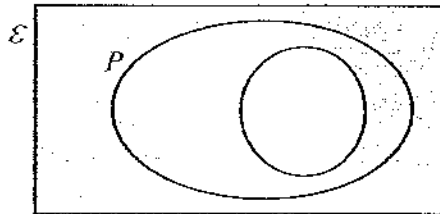
10 (a) $A(-7, 0)$, $B(3, 0)$, $C(0, 63)$

(b) $(-2, 75)$

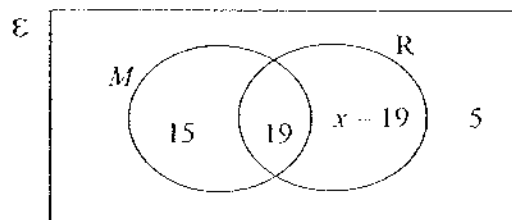
Part 1 consists of 8 printed pages, including the cover page.

[Turn over

11 (a)



(b) (i)



(b) (ii) 40

12 (a) $x = 6$

(b) 24 unit²

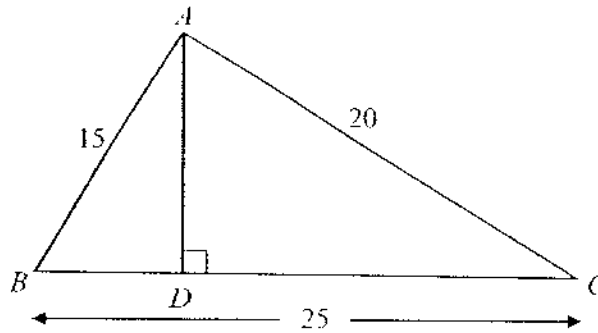
(c) $y = \frac{9}{8}x + 2\frac{1}{4}$ or $8y = 9x + 18$

13 (a) $b = \pm \sqrt{\frac{a - cd}{2c}}$

(b) $\frac{3}{2(x-3)^2}$

- 1 p is inversely proportional to q . Find the percentage change in p when q is halved. [3]

2



In triangle ABC , D is a point on BC such that $\angle ADC = 90^\circ$. It is given that $AB = 15$ cm, $BC = 25$ cm, $AC = 20$ cm.

- (a) Show that ABC is a right-angled triangle. [2]
 (b) Show that triangle ABC is similar to triangle DAC . [2]

3 (a) Simplify $\frac{3a+7b}{16a^2-49(a+b)^2}$. [3]

(b) Solve the equation $\frac{2x+14}{5x^2-245} + \frac{3}{10(x-7)} = 1$. [3]

4 The number of books read by 40 students in a year is given in the table below.

Number of books	Frequency f	Mid-value x	fx
$55 < x \leq 65$	5		
$65 < x \leq 75$	11		
$75 < x \leq 85$	15		
$85 < x \leq 95$	9		
	$\Sigma f =$		$\Sigma fx =$

- (a) Copy and complete the table. [2]
 (b) Calculate the mean number of books read. [2]
 (c) 2 students are transferred out of the class and both of them read more than 85 books. If a student is chosen at random from the remaining students, find the probability that he read more than 75 books. [2]

- 5 (a) The heights of 15 students were measured. The data was tabulated in the following stem and leaf diagram:

14	8			
15	2	x	9	9
16	2	5	5	7
17	1	4	4	6
18	0			

- (i) The mean height is 164.6 cm. Find the value of x . [3]
- (ii) Hence, find the mode and median height of the students. [2]
- (b) The mean of 6 consecutive odd numbers is 128.
- (i) Find the largest of these numbers. [3]
- (ii) What is the median number? [2]

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

The following table shows some values of x and the corresponding values of y where $y = x^2 - 10x + 24$.

x	1	2	3	4	5	6	7
y	15	8	3	0	q	0	3

- (a) Find the value of q . [1]
- (b) Using a scale of 2 cm to represent 1 unit on the x -axis and 1 cm to represent 1 unit on the y -axis, draw the graph of $y = x^2 - 10x + 24$. [3]
- (c) Use your graph to find
- (i) the value of y when $x = 2.5$, [2]
- (ii) the solution(s) for $x^2 - 10x + 24 = 2$. [2]
- (d) Draw and write down the equation of the line of symmetry for the graph $y = x^2 - 10x + 24$. [2]

7.

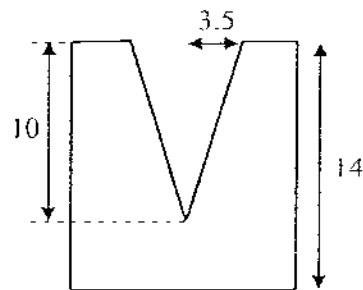


Diagram 1

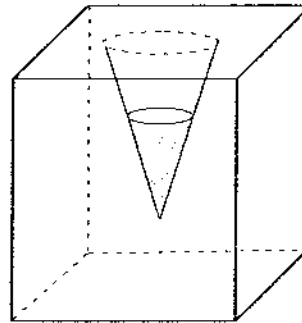


Diagram 2

Diagram 1 shows the side view of a solid cube with an inverted cone removed from the top. The length of each side of the cube is 14 cm. The cone has a base radius of 3.5 cm and a height of 10 cm. Calculate

- (a) the volume of the cone, [2]
- (b) the volume of the remaining solid, [2]
- (c) the surface area of the remaining solid. [4]

The solid is then filled with water as shown in Diagram 2. The depth of the water is $\frac{3}{5}$ of the height of the cone.

- (d) Calculate the volume of the water in the solid. [3]

End of Part 2

Answer Key (P2) Victoria

1	100% increase																								
3	(a) $\frac{-1}{11a+7b}$ (b) $x = 7\frac{7}{10}$																								
4	<p>(a)</p> <table border="1"> <thead> <tr> <th>Number of hours</th> <th>Frequency, f</th> <th>Mid-value(x)</th> <th>fx</th> </tr> </thead> <tbody> <tr> <td>$55 < x \leq 65$</td> <td>5</td> <td>60</td> <td>300</td> </tr> <tr> <td>$65 < x \leq 75$</td> <td>11</td> <td>70</td> <td>770</td> </tr> <tr> <td>$75 < x \leq 85$</td> <td>15</td> <td>80</td> <td>1200</td> </tr> <tr> <td>$85 < x \leq 95$</td> <td>9</td> <td>90</td> <td>810</td> </tr> <tr> <td></td> <td>$\sum f = 40$</td> <td></td> <td>$\sum fx = 3080$</td> </tr> </tbody> </table> <p>(b) 77</p> <p>(c) $P(\text{number of book read is not more than 75 hours}) = \frac{11}{19}$</p>	Number of hours	Frequency, f	Mid-value(x)	fx	$55 < x \leq 65$	5	60	300	$65 < x \leq 75$	11	70	770	$75 < x \leq 85$	15	80	1200	$85 < x \leq 95$	9	90	810		$\sum f = 40$		$\sum fx = 3080$
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5	<p>(ai) $x = 8$</p> <p>(aii) The median = 165 cm. The mode = 159 cm</p> <p>(bi) 133</p>																								
6	<p>(a) $q = -1$</p> <p>(c)i) When $x = -2.5$, $y = 5.3 (\pm 0.1)$ ii) When $y = 2$, $x = 3.3$ or $6.7 (\pm 0.1)$</p> <p>(d) $x = 5$</p>																								
7	<p>(a) 128</p> <p>(b) 2620</p> <p>(c) 1250</p> <p>(d) 27.7</p>																								