

Second Term Test - Grade 10 - 2019

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Name/Index No: Mathematics - I

Time: 02 hours

- Answer all the questions on this paper it self.
- Each question carries two marks in part A and 10 marks in part B.

Part A

(1) If $441 = 3 \times 3 \times 7 \times 7$, find the value of $\sqrt{441}$

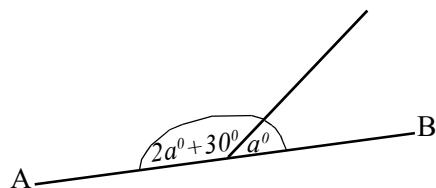
(2) Solve. $(x-2)(x-3)=0$

(3) Find the L.C.M. of following algebraic terms.

$m^2n, n^2, 3mn$

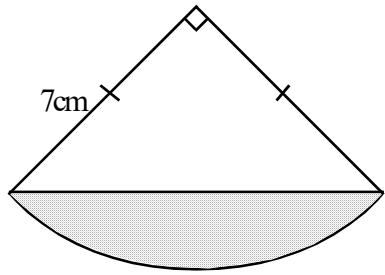
(4) In the diagram AB is a straight line.

Find the value of 'a'.



(5) From a tap 60 ml of water is leaked within 5 minutes. Find the wasted amount of water within 2 hours from this tap.

(6) The figure shows a sector of radius 7cm. If its area is 38.5cm^2 , find the area of the shaded portion.



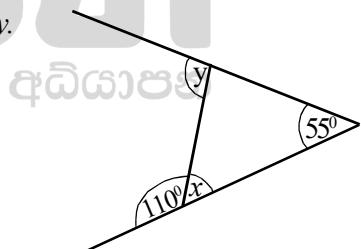
(7) The annual income of a person is Rs. 850 000. According to the following table, find the income tax he has to pay for a year.

Annual income	Tax percentage
Initial 500 000	Tax free
Next 500 000	4%
Next 500 000	8%

(8) Simplify and keep the answer in the simplest form.

$$\left(2 + \frac{1}{3}\right) \text{ of } \frac{2}{7}$$

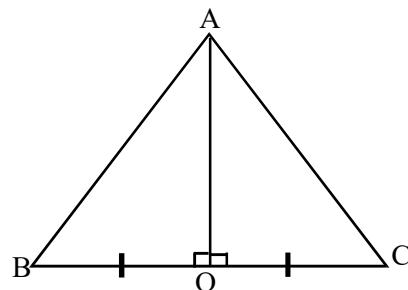
(9) According to the information given in the figure, find the value of x and y .



(10) Write in index form.

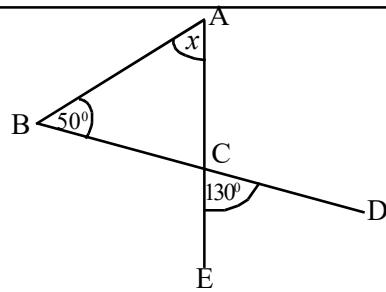
$$\log 100 = 2$$

(11) According to the data given in the diagram, write the case of congruency of the triangle ABO and triangle ACO.



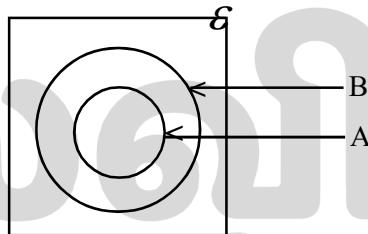
(12) Solve $\frac{x}{2} + \frac{x}{4} = 6$

(13) In the diagram, AE and BD are intersected at C. Find the value of x .



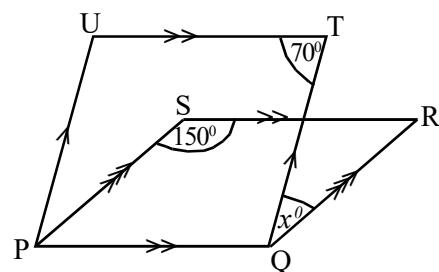
(14) Simplify. $\frac{5}{x} - \frac{2}{x^2}$

(15) Shade the region $A' \cap B$ in the given venn diagram.

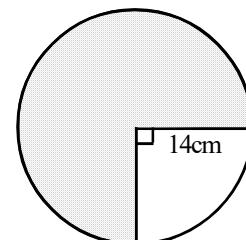


(16) If $a + b = 7$, $ab = 12$, find the value of $a^2 + b^2$

(17) According to the data given in the diagram, find the value of x .

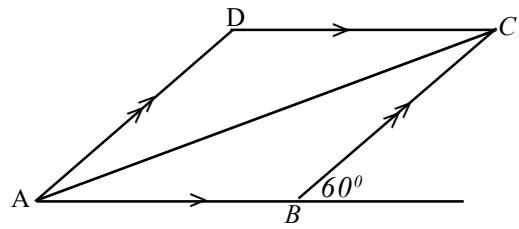


(18) Find the arc length of the shaded sector



(19) ABCD is a parallelogram and the area of the triangle ABC is 64cm^2

(i) Find the area of the parallelogram ABCD

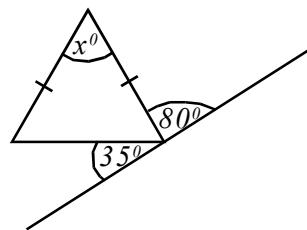


(ii) Find the value of \hat{ADC}

(20) If $n(A) = 25$, $n(B) = 21$, and $n(A \cup B) = 24$ find $n(A \cap B)$

(21) According to the data given in the diagram,

Find the value of x .



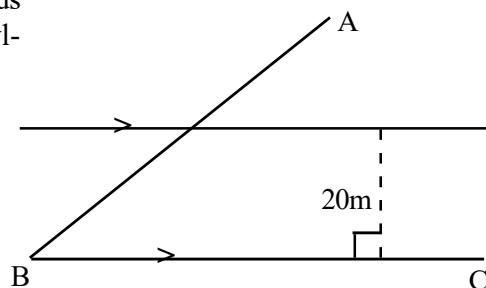
(22) Find the equation of the straight line with the gradient of (-4) and passes through the point (2, 0)

(23) In the given sector, if the arc length is $\frac{11a}{7}$, find its radius.



(24) The mean mass of four students is 45 kg. After removing a student from them, the mean mass of remaining three students is 43 kg. Find the mass of the removed student.

(25) Kamal's house is situated with the equidistance from the two roads AB and BC and 20 m away from the road BC. Using the knowledge of loci sketch the location of Kamal's house.



Part B

(1) Mr. Perera spent his monthly salary as follows.

(i) If he separate $\frac{1}{5}$ of his salary for foods, find the remaining amount as a fraction of total salary.

(ii) If he spent $\frac{1}{3}$ of the remaining for education of his two daughters equally, find the amount spent for a daughter as a fraction of total salary.

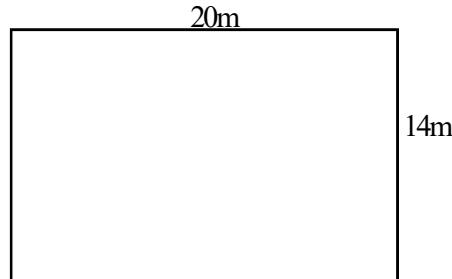
(iii) If a daughter received Rs. 6000, find the monthly salary of Mr. Perera.

(iv) In this month, if he spent Rs. 15000 for painting the house also, find the remaining amount of money with Mr. Perera.

(2) The diagram shows a rectangular flower bed.

Its length and breadth is 20 m and 14 m respectively.

(i) Find the area of the flower bed.



(ii) It is suggested to create two semi circular ponds in outside of the flower bed such that the width sides of the flower bed as the diameter of the ponds. Draw the location of two ponds on the above diagram.

(iii) Find the area of the land separated for the two ponds.

(iv) It is needed to create a fence around the flower bed including the two ponds. If the gap between the two consecutive posts is 2m, find the number of posts needed.

(3) A custom duty of 30% of the value of the item is charged from Mr. Saman when a motor bike worth Rs. 250 000 imported.

(i) Find the value of the motor bike after paying duty.

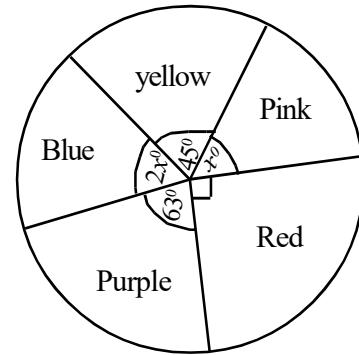
(ii) To obtain a profit of 12% from the motor bike, what is the price he should be marketed.

(iii) If when selling the motor bike on cash price, it is given a Rs. 18 200 of discount. Find the discount percentage given.

(iv) When selling a motor bick on cash price, find the net profit obtained by Mr. Saman from a motor bick.

(4) The following pie chart represents the information about the favourite colour of a group of grade 10 students in a certain school.

(i) Find the angle of the sector which represents the students who like to blue colour.



(ii) If the number of students like to yellow colour is 05, find the total number of students in grade 10 class.



(iii) Find the ratio between the number of students who like to purple colour and rose colour.

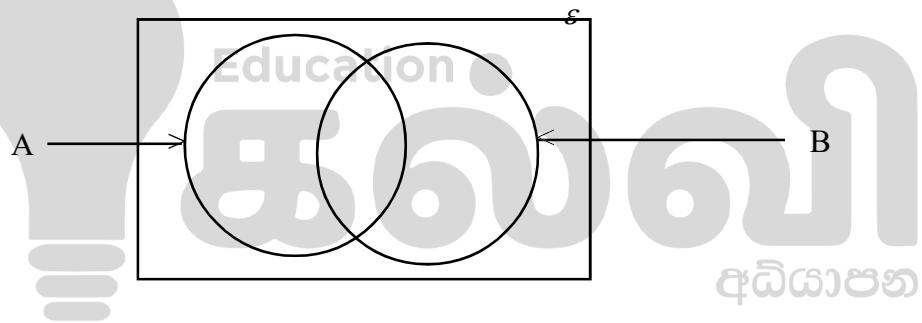
(iv) If two new students are joined to this class and they like to yellow colour, find the angle of the sector relevant for the yellow colour of the newly drawn pie chart including the two new students.

(5) (a) $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 $A = \{1, 4, 9\}$
 $B = \{\text{Even numbers between 1 and 10}\}$

(i) Write set A as a description.

(ii) Write set B by listing elements.

(iii) Insert the above data in the given venn diagram.



(iv) From the numbers in the above venn diagram, if a number is selected randomly, find the probability of that number is bieng an element of set B.

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Name/Index No: Mathematics - II

Time: 03 hours

- Answer ten questions selecting five questions from part A and five questions from part B.
- Write the relevant steps and the correct units in answering the questions.
- Each question carries 10 marks.

Part A

(1) An incomplete values of table prepared to draw the graph of the function $y = x^2 - 5$ is given below.

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

(i) Find the value of y when $x = 0$
 (ii) Using the scale of 10 small divisions as one unit along the x axis and along the y axis. draw the graph of the above function on a graph paper.

Using the graph,

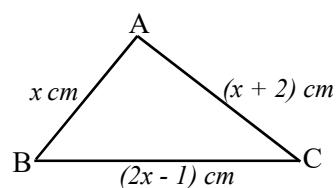
(iii) Write the minimum value of the function.
 (iv) Write the range of values of x which the function is negative.
 (v) Write the equation of the graph which is obtained when the above graph is shifted upwards by 2 units and write the co-ordinates of the vertex point of it.

(2) (i) Make ' a ' as the subject of the formula $s = \frac{n}{2}(a + \ell)$

(ii) If the perimeter of the following triangle is 21 cm , find the length of the side BC.

(iii) Solve the following quadratic equation.

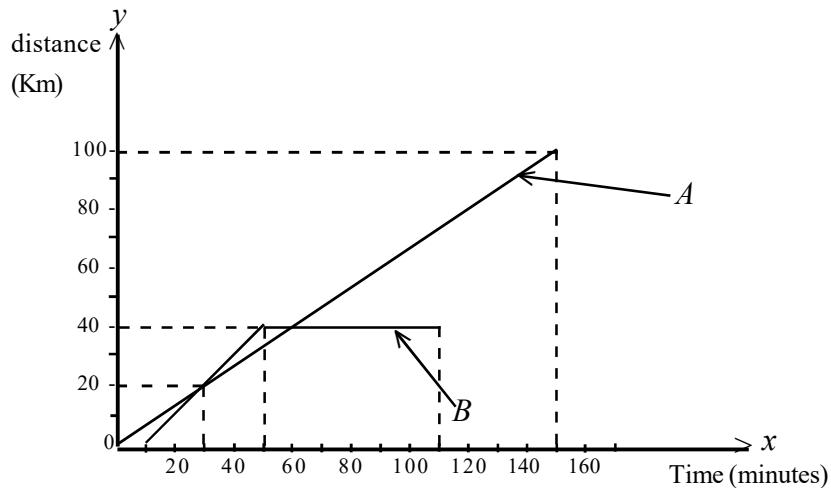
$$2x^2 + 5x - 3 = 0$$



(3) (i) It takes 8 men 5 days to harvest in the Mr. Siripala's paddy field. After working 4 days the next day they did not return to work. Therefore Mr. Siripala was completed the remaining task using a harvesting machine within 2 hours. If he harvested the entire paddy field, using the above machine, find the time taken for it.

(ii) For harvesting, Mr. Siripala borrowed a loan of Rs. 40 000 at a monthly interest rate of 3% from a farming society. To get release from the loan, if he pays Rs. 7200 as interest, find the time taken to settle the loan.

(4) A distance time graph of the motion of two buses A and B which travel from Kurunegala to Anuradhapura on the same route is given below.



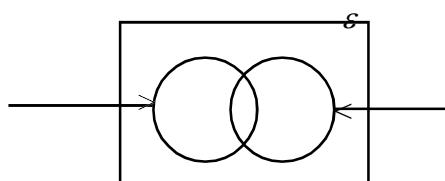
- (i) After how much time did bus B depart, from the departure time of bus A.
- (ii) After how many minutes did the bus B overtake the bus A, from the departure time of bus A.
- (iii) Find the speed of the bus A in kmh^{-1}
- (iv) Due to the mechanical error, the bus B had to stop on the way. How much distance has the bus B travelled by that time.
- (v) After one hour the bus B recovered its mechanical error and again started the journey. Then if the two buses A and B arrive at Anuradhapura at the same moment, find out the uniform speed of the bus B which should travel after recovering the mechanical error.

(5) In a certain day, the sum of the number of three-wheelers and number of motor cars arrived to a park is 19. The sum of the number of wheels of that three-wheelers and motor cars is 65.

- (i) By building up two simultaneous equations, hence find the number of three-wheelers and number of motor cars arrived to the park on that day separately. (Take number of three-wheelers as x and number of motor cars as y)
- (ii) For parking the vehicles, if Rs. 40 is charged from a three-wheeler and Rs. 100 is charged from a motor car, find the income obtained by the owner of the park from three-wheelers and motor cars on that day.

(6) There are only red and white colour flowers in the flower basket prepared by Sama to carry away the temple. The total number of flowers in the basket is 30. Of which 15 are red flowers. 10 are temple flowers. 3 are red temple flowers and others are lotus flowers.

- (i) Copy the given venn diagram in to your answer sheet and insert the above information in it.



Using the venn diagram,

- (ii) Find the number of white temple flowers in the basket
- (iii) Find the number of red lotus flowers in the basket.
- (iv) Find the number of white lotus flowers in the basket.

Part B

(7) (i) Simplify and keep the answer with positive indices.

$$\frac{x^3 \times x^{-7}}{x^2 \times x^0}$$

(ii) Solve.

$$\log_a 8 + \log_a x = \log_a 24$$

(iii) Find the value using the logarithmic table.

$$\frac{325 \times 7.8}{33.8}$$

(8) The information about the mass of pumking picked in a certain day from a vegetable garden is given in the following table.

Mass of a pumking (kg)	1	2	3	4	5	6
Number of pumking	3	12	8	9	6	2

(i) Find the mode of the above distribution.
 (ii) Find the mean mass of a pumking to the nearest kg.
 (iii) If the owner of the vegetable garden picked 750 number of pumking during a certain month and sold 1 kg of pumking for Rs. 35. By selling the pumking, find the income obtained by him in this month.

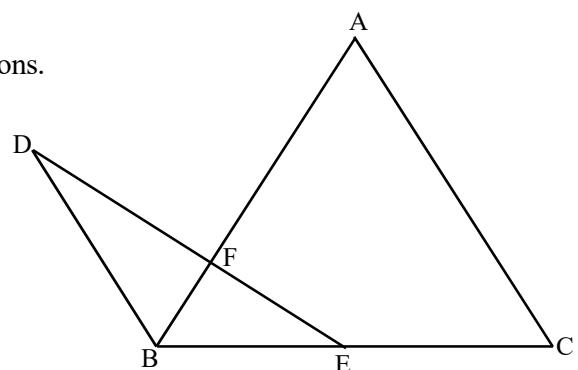
(9) Using only a straight edge with a cm / mm scale and a pair of compasses and showing the construction lines clearly,

(i) Construct the straight line segment AB = 6cm.
 (ii) Construct a perpendicular to AB through B.
 (iii) Mark point C on the above perpendicular such that BC = 6 cm and join A and C.
 (iv) Construct the perpendicular bisector of AB and mark the intersection point of it and AC as O.
 (v) Construct a perpendicular from O to BC and If the intersection point of it and BC is P, measure and write the length of OP.

(10) In the following figure $AB = AC$, $AC \parallel DB$, $\hat{BDE} = 30^\circ$ and $\hat{FBE} = 50^\circ$

(i) Copy the figure on to your answer sheet and mark the above data on it.
 (ii) Find the value of the following angles by giving reasons.

(a) \hat{ACB}
 (b) \hat{BAC}
 (c) \hat{DBF}
 (d) \hat{DFA}



(11) The following table gives information about the desert obtained after the lunch by a group of students who participated for a educational trip.

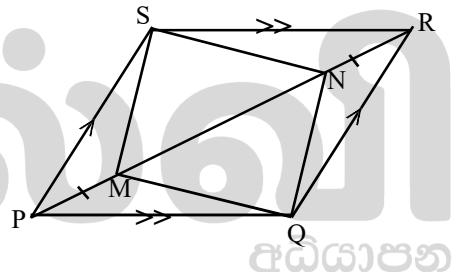
	eaten ice cream	eaten chocolate
Girls	12	13
Boys	18	22

(a) Among the above students, if a student is selected randomly, find the probability of that student

- (i) is being a boy who ate chocolate
- (ii) is being a girl who ate ice cream
- (iii) is being a student who ate chocolate
- (iv) is being a boy.

(b) Write the number of girls who ate chocolate as a percentage of total number of students who participated for the trip.

(12) In the parallelogram PQRS given in the figure, M and N are the two points on the diagonal PR such that $PM = NR$. Show that MQNS is a parallelogram.



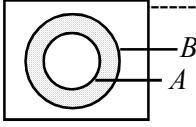
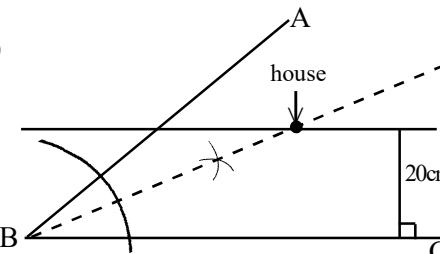
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Mathematics - Answer Sheet

Paper I

Part A

(1) 21	-----	2	(14) $\frac{5x-2}{x^2}$	-----	2
(2) $x = 2$ or $x = 3$	-----	1	(15)		2
(3) $3m^2n^2$	-----	2	(16) $a^2 + b^2 = 25$	-----	2
(4) $2a + 30 + a = 180^{\circ}$ $a = 50^{\circ}$	-----	1	(17) Obtaining $\hat{PQT} = 110^{\circ}$ or $\hat{PQR} = 150^{\circ}$ $x = 40^{\circ}$	-----	1
(5) $60 \times 12 \times 2ml / 1440ml$ 1.44ℓ	-----	1	(18) $\frac{3}{4} \times 2 \times \frac{22}{7} \times 14$ 66cm	-----	1
(6) $\frac{1}{2} \times 7 \times 7 = 24.5cm^2$ 14cm ²	-----	1	(19) (i) $128cm^2$ (ii) 120°	-----	2
(7) $\frac{4}{100} \times 350,000$ Rs. 14 000	-----	1	(20) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ $n(A \cap B) = 12$	-----	2
(8) $\frac{7}{3}$ of $\frac{2}{7}$	-----	1	(21) $x = 50^{\circ}$	-----	2
$\frac{2}{3}$	-----	2	(22) Obtaining $c = 8$ $y = -4x + 8$	-----	2
(9) $x = 70^{\circ}$ $y = 125^{\circ}$	-----	1	(23) radius = a	-----	2
(10) $10^2 = 100$	-----	2	(24) 51 kg	-----	2
(11) S.A.S	-----	2	(25)		2
(12) $\frac{2x}{4} = 6$ $x = 8$	-----	1			
(13) Obtaining $\hat{BAC} = 80^{\circ}$ $x = 50^{\circ}$	-----	1			

Paper - B

(1)	(i)	$\frac{4}{5}$	1	(iii) $\frac{18200}{36400} \times 100\%$ 5% (iv) Selling price of the motor bick $= 364000 - 18200 = \text{Rs. } 345800$ Net profit = $345800 - 325000 = \text{Rs. } 208000$	2
	(ii)	$\frac{4}{5}$ of $\frac{1}{3} \div 2$	1		1
		$\frac{2}{15}$	1 - 2		1 - 3
	(iii)	$\frac{6000}{2} \times 15$	2		10
		Rs. 45 000	1 - 3		
	(iv)	Rs. 9000 - For foods	1		
		Rs. 12 000 - For daughters			
		Rs. 9000 + Rs. 12000 + Rs. 15000			
		= Rs. 36000	1		
		remaining amount			
		= Rs. 45000 - Rs. 36 000	1		
		= Rs. 9000	1 - 4		
		(Any suitable method)			
			10		
(2)	(i)	20×14	1	(i) $3x + 45^\circ + 63^\circ + 90^\circ = 360^\circ$ $2x = 108^\circ$ (ii) 40 (iii) 7 : 6 (iv) No.of students who like to yellow $= 5 + 2 = 7$ Total no.of students = $40 + 2 = 42$	1
		280 cm ²	1 - 2		1 - 2
	(ii)	Drawing 2 ponds correctly in the diagram	2		2
	(iii)	$\frac{1}{2} \times \frac{22}{7} \times 7 \times 7 \times 2$	1		1
		154 cm ²	1 - 2		10
	(iv)	$\frac{1}{2} \times 2 \times \frac{22}{7} \times 7 \times 2 = 44\text{cm}$	1		
		44cm + 40 cm = 84 cm	1		
		$\frac{84}{2}$	1		
		42 posts	1 - 4		
			10		
(3)	(i)	$\frac{130}{100} \times 250000$	1	(i) For a correct description (ii) B = {2, 4, 6, 8} (iii) 1, 9 4 2, 6, 8 3, 5, 7, 10 (iv) $\frac{4}{10}$	2
		Rs. 325 000	1 - 2		2
	(ii)	$\frac{112}{100} \times 325000$	1		10
		Rs. 364 000	1 - 2		

Paper II

Part A

Part A		
(1) (i) -5	1	
(ii) correct axis	1	
marking points	1	
smooth curve	1	
(iii) -5	1	
(iv) $-2.2 < x < 2.2 (\pm 0.1)$	2	
(v) $y = x^2 - 3$	1	
$(0 - 3)$	2	
	3	
	10	
(2) (i) $\frac{2s}{n} = a + \ell$	1	
$a = \frac{2s}{n} - \ell$	1	
	2	
(ii) $x + x + 2 + 2x - 1 = 21$	1	
$4x = 20$		
$x = 5$	1	
length of BC = 9cm	1	
	3	
(iii) $2x^2 + 6x - x - 3 = 0$	1	
$2x(x + 3) - 1(x + 3) = 0$		
$(x + 3)(2x - 1) = 0$	1	
$x + 3 = 0$ or $2x - 1 = 0$	1	
$x = -3$ or $x = +1/2$	2	
	5	
	10	
(3) (i) 40 men days	1	
part of covered = $8 \times 4 = 32$	1	
remaining = $40 - 32 = 8$	1	
2 machine hours = 8 men days		
1 mechanical hour = 4 men a days	1	
time allocated = $\frac{40}{4}$	1	
	6	
	10 hours	1
(ii) $\frac{7200 \times 100}{40000 \times 3}$	3	
6 months	1	
	4	
	10	

(4) (i) 10 minutes	2
(ii) 30 minutes	2
(iii) $\frac{100}{150} \times 60$	1
40 kmh^{-1}	1
	2
(iv) 40 km	2
(v) $\frac{60}{40} \times 60$	1
90 kmh^{-1}	1
	2
	10
(5) (i) $x + y = 19$	1
$3x + 4y = 65$	1
$3x + 3y = 57$	1
$y = 8$	1
$x = 11$	1
Three-wheelers = 11	1
motor cars = 8	1
	7
(ii) $40 \times 11 = \text{Rs. } 440$	1
$100 \times 8 = \text{Rs. } 800$	1
Income = $\text{Rs. } 1240$	1
	3
	10
(6) (i) naming sets	1
mark 30, 15, 10, 3	2
	4
(ii) 7	2
(iii) 12	2
(iv) 8	2
	10
(7) (i) x^{-6}	1
$\frac{1}{x^6}$	1
	2
(ii) $\log_a 8x = \log_a 24$	1
$x = 3$	1
	2
(iii) $\lg 325 + \lg 7.8 - \lg 33.8$	1
$2.5119 + 0.8921 - 1.5289$	2
$3.4040 - 1.5289$	1
anti log 1.8751	1
75	1
	6
	10

		(8)	
		(i) 2	1
(ii)		$\frac{fx}{\sum f}$	2
3		24	24
24		36	2
36		30	1
12		12	1
<u>129</u>		$\sum fx = 129$	1
$\sum f = 40$		$\frac{\sum fx}{\sum f} = \frac{129}{40}$	1
= 3.225		1	1
≈ 3kg		6	6
(iii) $35 \times 3 \times 750$		2	2
Rs. 78750		1	3
-----		10	10
(9)		(i) constructing AB	1
(ii) constructing perpendicular		2	2
(iii) marking C		1	1
joining AC		2	2
(iv) perpendicular bisector		1	1
naming O		2	2
(v) constructing perpendicular		2	2
OP = 3cm		1	3
-----		10	10
(10)		(i) marking that isosceles and parallel	1
30° and 50°		1	2
(ii) a) 50° (correct reason)		1+1	2
b) 80° (correct reason)		1+1	2
c) 80° (correct reason)		1+1	2
d) 110° (correct reason)		1+1	2
-----		10	10
(11)		(a) (i) $\frac{22}{65}$	2
(ii) $\frac{22}{65}$		2	2
(iii) $\frac{35}{65}$		2	2
(iv) $\frac{40}{65}$		2	2
(b) $\frac{13}{65} \times 100\%$		1	1
20%		1	2
-----		10	10
(12)		In the Δ SNR and Δ PMQ, SR = PQ (opposite sides of \square)	
$\hat{S}R\hat{N} = \hat{P}\hat{M}\hat{Q}$ (Alternative angles)		RN = PM (data)	
$\therefore \Delta$ SNR \equiv Δ PMQ (S.A.S)		4	
$\therefore SN = MQ$ —(1)		(corresponding elements of $\equiv \Delta$)	
$\hat{S}N\hat{R} = \hat{P}\hat{M}\hat{Q}$		1	
(corresponding elements of $\equiv \Delta$)		1	
$\therefore 180 - \hat{S}\hat{N}\hat{R} = 180 - \hat{P}\hat{M}\hat{Q}$ (axiom)		1	
$\therefore \hat{S}\hat{N}\hat{M} = \hat{N}\hat{M}\hat{Q}$		1	
$\therefore SN // MQ$ —(2)		2	
(∴ Alternative angles are equal)		2	
from (1) and (2),		in the quadrilateral MQNS	
SN = MQ and SN // MQ		1	
∴ it is a parallelogram		1	
(∴ a pair of opposite sides is = and //)		1	
or		any correct method	
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