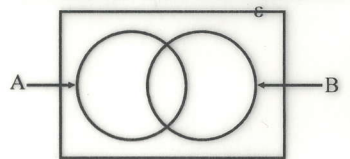| Grade 10	**Third Term Test 2023(2024)**	32	E	I

Name :	**MATHEMATICS I**	Time : 02 Hours

- Answer all the questions on this paper itself.
- Indicate the relevant steps and the correct units when answering the questions.
- Marks are awarded as follows. In part A, 02 marks for each question and in part B, 10 marks for each question.

Part A

01. Calculate the interest received at the end of one year by a person who deposits Rs. 30 000 in a financial institute at 8% annual simple interest.

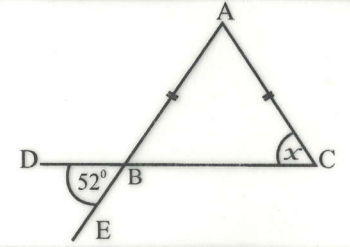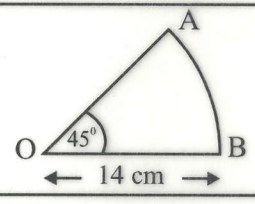02. Shade the region $A' \cap B$ in the given venn diagram.

03. Find the value of x.

04. Find the least common multiple of the following algebraic terms.
$2ax^2$, $4ax$, $8x^2$

05. Write $\log_2 32 = x$, in index form.

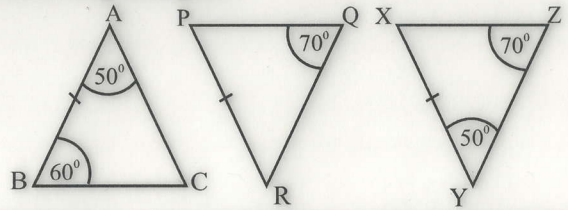06. Using the information given in the figure , Find the value of x

07. Find the arc length AB, of the following sector.
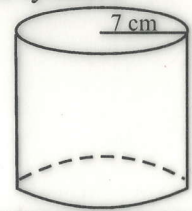

08. Factorize.
$2x^2 - 2$

09. Select and Write the Pair of congruent triangles from the following triangles.

10. Simplify.

$$\frac{1}{x} - \frac{2}{x^2}$$

11. The curved surface area of the cylinder with radius 7cm is 440cm^2. Find the height of the cylinder.

12. The centre of the circle given in the figure is O. AOCD is a parallelogram. Find the value of $A\hat{O}B$
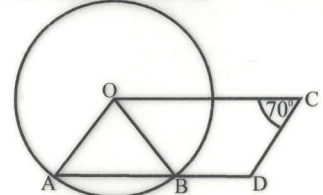
13. Solve. $x(x+5)=0$

14. A person who borrowed Rs. 10 000 paid Rs. 11 200 at the end of a year to got release from the loan. Calculate the annual simple interest rate charged.

15. The centre of the circle is O. Its radius is 13cm and OP=5cm. Find the length of the chord AB.
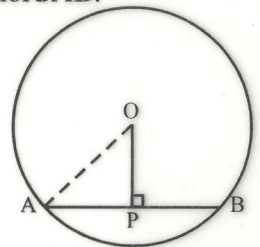
16. In a grouped frequency distribution, its assumed mean is 40 and the mean of the deviation is -2.2cm. Find the actual mean of that distribution.

17. Solve

$$\frac{2x}{3} - 1 = 5$$

18. Find the value of x.
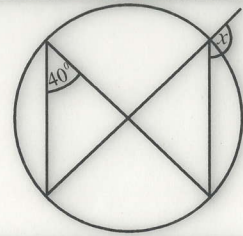
19. Find the time taken to fill a 1000l water tank through a pipe flowing water at the rate of 50 litres per minute.

20. The centre of the circle is O. Find the value of x
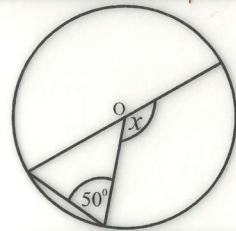
21. Following is a distance-time graph showing the motion of a car. Find the speed of the car in kilometers per hour.
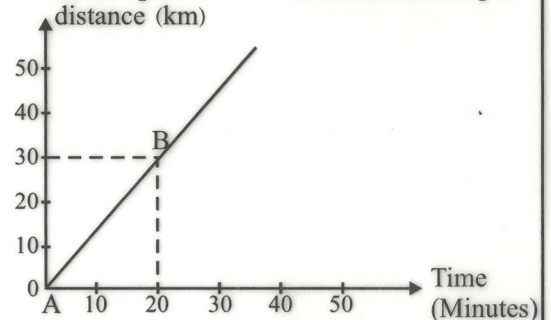
22. In a vessel, there are 3 red pens and 5 blue pens which are identical. Saman draws a pen randomly from it. Find the probability of that pen being a red pen.

23. Find the value of $\sqrt{19}$ to the first approximation.

24. The gradient of the straight line given in the Cartesian plane is 2.
    Write the equation of it.
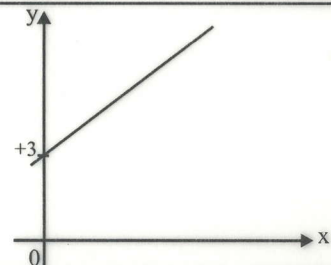
25. Obtain the point P by showing construction lines, which is 5cm away from the straight line AB and equidistant from the points A and B.
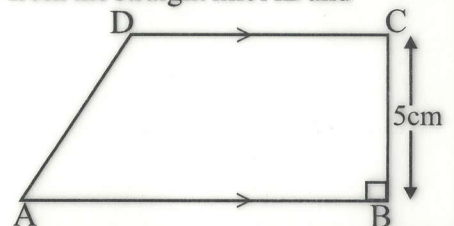
Part B

(01) a) Simplify. $\dfrac{3}{4} - \dfrac{1}{4} \div 1\dfrac{1}{6}$

b) $\dfrac{3}{8}$ of the milk taken in a day from 4 domestic diary cows was set aside to make yogurt, $\dfrac{9}{10}$ of the rest was sold and the rest was kept for home consumption.

   i.   After separating to make yogurt, Express the remaining amount of milk as a fraction of the total amount of milk.

   ii. Express the amount of milk sold as a fraction of the total amount of milk.

   iii. On that day equal amounts of milk were taken from each cow and the amount of milk kept for drinking at home was 2 liters .How many litres of milk is taken from one cow?

(02) A wall decoration, with a ABCD rectangular part, APQR square part and PDQ sector part is cloured as shown in the figure.
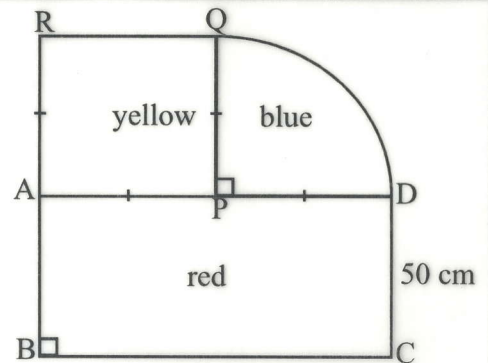
   i.   If the area of the red coloured part is 3 500cm², Find the length of AD and find the radius of the sector according to the information given in the figure.

   ii. Find the area of the blue coloured sector.

   iii. How much is the area of the part coloured with yellow colour greater than the area of the part coloured with blue colour ?

   iv. A black thread is pasted around the coloured wall decoration. Find the length of the thread.

(03) 100 women work 8 hours for a day in a garment factory. The factory owner expects to sew a pile of clothes in four days using those 100 women workers.

i. Find the number of man days required to finish sewing the above pile of cloths.

ii. After working all women in two days, 25 women workers were given one day off due to several machines being down. At the end of third day, find the amount of task completed in man days?

iii. If all the women workers come to work on the last day, find the additional number of hours that one woman must work to finish sewing the pile of cloths as expected.

(04) Here is a pie chart prepared from the information gathered from the people of a small village.

i. If there are 40 people over 60 years , find the total population of the village.

ii. If the number of school going children is 10 more than the number of people over 60 years, find the angle of the sector which represents the school children.

iii. How many people are employed?

iv. For the next year, the ratio of children under 5 years, School going children, People who are employing and people over 60 years in this village is predicted as 2:3:5:2. In the pie chart drawn accordingly, Find the angle of the sector that represents the children under 5 years.

School going children

40°
80°

Children under 5 years

People over 60 years

People who are employing.

(05) In a box there are 3 red apples and 2 green apples which are in same
shape and size. Surani, randomly took an apple from it and put it back.
Then took another one from it.

2nd drawn

i. Using the symbol 'x" represent the sample space of the above
experiment in the given grid.

G_2
G_1
R_3
R_2
R_1

ii. Find the probability that surani gets red apples in both times.

R_1 R_2 R_3 G_1 G_2
1st drawn

iii. Encircle the event of getting a red apple only once on the grid and name if as P.
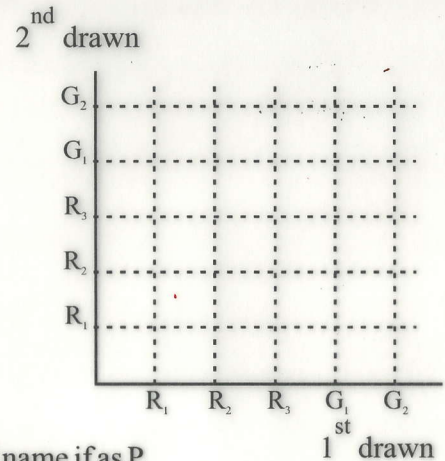
b) Below is an incomplete tree diagram related to getting apples by suruni.

1st drawn

Red

3/5

....
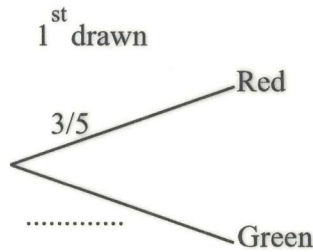
Green

i. Write the relevent probability for the blank and Extend the tree diagram up to drawing apples by suruni
in second time.

ii. Find the probability, that suruni gets a green apple at least once.

Grade 10	**Third Term Test 2023(2024)**	32	E	II

Name:	**MATHEMATICS II**	**Time : 03 Hours** Additional reading time: 10 min.

Instructions
- Answer 10 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.
- The volume of a right circular cylinder with base radius r and height h is $V = \pi r^2 h$.

Part A

(01) i. If the annual assessed value of a business building owned by Mr.Samarathunga is Rs.150 000 and the annual rates percentage is 8%. Find the amount of rates that Mr.Samarathunga has to pay per year.

ii. By renting out the above building, Mr. Samarathunga obtains one year's rent at once and Rs. 36 000 is paid as income tax for that rental amount. He had to pay income tax as follows.

Annual income	Tax percentage
First Rs. 500 000	Free
Second Rs. 500 000	4%
Third Rs. 500 000	8%

Find the monthly rent amount of the business building.

(02) a) The price of two hand bags and an umbrella is Rs.6 100. The price of a hand bag is Rs. 300 more than the price of two umbrellas.
   i. Taking the price of a hand bag as Rs. x and the price of an umbrella as Rs.y, build up a pair of simultaneous equations related to the above information.
   ii. By solving the above pair of equations, find the price of a hand bag and the price of an umbrella separately.

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

(03) a) An incomplete table prepared to draw the graph of the function $y = x^2 - 4$ is given below.

x	-3	-2	-1	0	1	2	3
y	5	0	-3	.....	-3	0	5

   i. Finding the value of y when $x=0$, Draw the graph of the above function using the scale of 10 small divisions as one unit along the both x axis and y axis.

b) Using the graph you drawn,
   i. Write the equation of the axis of symmetry.
   ii. Write the interval of values of x for which the function is increasing negatively.
   iii. Write down the equation of the graph which is obtained when the above graph is shifted upwards by 2 units along the y-axis.
   iv. Deduce the co-ordinates of the turning point of the graph mentioned in above (iii).

(04) The following table shows the information about the amount of cereal flour wasted in a month while packing cereal flour in a mill.

(5- 11 means, 5 or greater than 5 but less than 11 and others denote similarly.)

amount of cereal flour wasted (g)	5-11	11-17	17-23	23-29	29-35	35-41	41-47
No of days	3	5	10	6	3	2	1

   i. What is the minimum amount of cereal flour wasted in a day?

   ii. By taking the mid value of the modal class as the assumed mean, find the mean amount of the cereal flour wasted in a day to the nearest whole number.

   iii. Show that the mass of the cereal flour wasted in 4 months will exceeds $2\frac{1}{2}$ kg.

(05) a) A thin trapezium shaped plate is shown in the figure. In this trapezium, AB=AD=x. If DC=5cm and the area of the trapezium is 12cm^2. Show that x satisfies the quadratic equation $x^2+5x-24=0$. By solving it find the value of x.
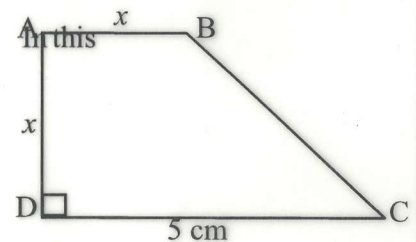
   b) By solving the inequality $5 - 2x \geq 1$, Write the set of positive integral solutions of x.

(06) a) A ship leaving the port P, travels 800km with the bearing of 070^0 and arrived at the port Q. The ship that left the port Q, travels 600km with the bearing of 160^0 and arrives at the port R.

     i. Show the above information in a rough sketch.

     ii. Find the magnitude of $P\hat{Q}R$.

   b) LT is a light house. The angle of depression of the ship moored at the port R from the top of the light house (T) is 35^0. When the ship travels 300km in a rectilinear path towards the light house and arrives at p, the captain of the ship sees the top of the light house with the angle of elevation 55^0.

Taking the scale of 1cm→100km, draw a scale diagram and find the actual height of the light house.
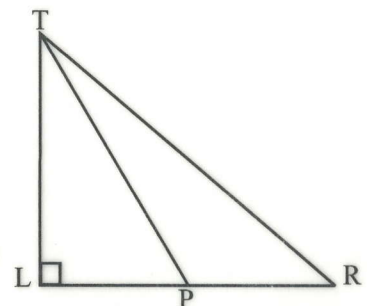
Part B

(07)   Below are some flowers cut from fabric in a pattern of increasing petals.

    i.   According to the number of petals in this flowers, Write an expression for the nth term of this pattern.

    ii. Find the number of petals in the 7th flower of the above pattern, using the knowledge of progressions.

    iii. Which flower has 13 petals cut in this pattern?

    iv. The first 7 flowers cut in this pattern are attached to a wire to form a single flower. Find the total number of petals in five such flowers.

(08)   Use only a straight edge with a cm / mm scale and a pair of compasses for the following constructions. Show the constructions lines clearly.

    i.   Construct the triangle ABC, Such that AB=6cm , $C\hat{A}B= 60^0$ and BC=AC.

    ii. Constructing the angle bisector of $A\hat{B}C$, Construct the circle with center O, Such that O is on the above angle bisector and AB is a chord of the circle.

    iii. By giving reasons, Explain which type of triangle ABC is according to the length of sides.

(09)   a) 14 cuboidal metal blocks of cross sectional area 80cm^2 and length l cm are made out of the metal. obtained by melting a right circular cylinder of base radius 14cm and height 20cm, without any wastage of metal. Find the length(l) of a cuboidal metal block.

    b) Find the value using logarithmic tables.
$$\frac{24.3 \times 5.32}{3.86}$$

(10)   ABCD is a parallelogram. The side BA is produces up to x , such that AB=AX. AD and XC intersect at Y and the mid point of BC is Z.

    i.   Copy the given figure into your answer script and include the above information in it. Then, show that AY=YD.

    ii. Show that AYZB is a parallelogram.
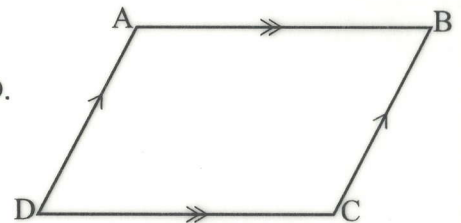
(11)   AB is a diameter of the circle with centre O. and BC//OD. Show that,

    i. $A\hat{C}D = \frac{1}{2} A\hat{B}C$

    ii. DO is the bisector of the $A\hat{O}C$.

    iii. AD=DC

    iv. The side AC is prependicular to the side DO.
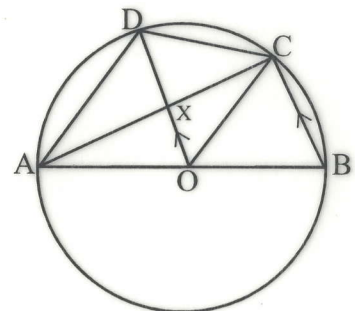
(12) Among 35 people who visited a shop selling only vegetables and fruits, 27 people bought vegetables and 12 people bought fruits. All those who bought fruits also bought vegetables.
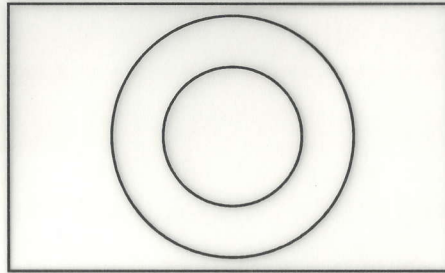
    i. Copy the given Venn diagram on to your answer sheet, name the sets appropriately and include the above information in it.

   ii. How many people did not buy vegetables or fruits?

  iii. How many people bought both fruits and vegetables.

  iv. If the set that bought vegetables is V and the set that bought fruits is F, Shade the region (F'∩V) on the Venn diagram and describe the people belonging to that region in words.

Third Term Test - 2023
Mathematics Answer sheet
Paper I - Part A

Grade 10

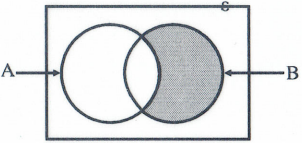| Q.No	Answer	Marks	
01.	**Rs.** 2400		1
	$\frac{8}{100}$ x 30000	1	2
02.			2
03.	$x = 50^0$	1	
	$x = 130^0 - 80^0$	1	2
04.	$8ax^2$		2
05.	$32 - 2^x$		2
06.	$x = 52^0$	1	
	$ABC = 52^0$	1	2
07.	$2 \times \frac{22}{7} \times 14 \times \frac{1}{8}$	1	
	11 cm	1	2
08.	$2(x-1)(x+1)$		2
	$2(x^2-1)$	1	
09.	ABC Δ and XYZ Δ		2
10.	$\frac{x-2}{x^2}$		2
11.	h = 10 cm		2
	$2 \times \frac{22}{7} \times 7 \times h = 440$		
12.	$A\hat{O}B = 40^0$		2
	$O\hat{A}B = 70^0$		
13.	$x = 0$	1	
	$x = -5$	1	2
14.	12%		2
	$\frac{1200 \times 100}{10000}$	1	
15.	AB = 24 cm		2
	AP = 12 cm	1	
16.	37.8		2
	40 - 2.2	1	

Q.No	Answer	Marks	
17.	x = 9		2
	$\frac{2x}{3} = 6$	1	
18.	$x = 140^0$		2
	$x = 180^0 - 40^0$	1	
19.	20 Minutes		2
	$50 = \frac{1000}{Time}$	1	
20.	$x = 100^0$		2
	50 x 2	1	
21.	90 kmh^{-1}		2
22.	$\frac{3}{8}$		2
23.	4. 4		
	4.3 x 4.3 = 18.49	1	
	4.4 x 4.4 = 19.36 }		
24.	y = 2x + 3		2
	C = 3	1	
25.	Perpendicular bisector of AB	1	
	Marking B	1	2
			50

Q.No	Answer	Marks
01.a.	$\frac{3}{4} - \frac{3}{4} \times \frac{6}{7}$	1
	$\frac{3}{4} - \frac{3}{14}$	1
	$\frac{28}{15}$	1 ③
b. i.	$\frac{5}{8}$	①
ii.	$\frac{5}{8} \times \frac{9}{10}$	1
	$\frac{9}{16}$	1 ②
iii.	$\frac{5}{8} - \frac{9}{16} - \frac{1}{16}$	1
	$2 \div \frac{1}{16}$	1
	$32 \, l$	1
	$\frac{32}{4} = 8 \, l$	1 ④
		10

Q.No	Answer	Marks
(02) i.	$\frac{3500}{50} = 70$ cm	1
	$\frac{70}{2} = 35$ cm	1 ②
ii.	$\frac{22}{7} \times 35 \times 35 \times \frac{1}{4}$	1
	962.5 cm²	1 ②
iii.	$35 \times 35 = 1225$ cm²	1
	$1225 - 962.5$	1 ②
	262.5 cm²	
iv.	$2 \times \frac{22}{7} \times \frac{1}{4}$	1
	55 cm	1
	$(35 \times 2 + (50 \times 2) + 55 + 70$	1
	295 cm ⎫ or 2.95 m ⎬	1 ④
		10

Q.No	Answer	Marks
(03) i.	$100 \times 4 = 400$	②
ii.	$100 \times 2 = 200$	1
	75	1
	$200 + 75 = 275$	1 ③
iii.	$400 - 275 = 125$	1
	$125 - 100 = 25$	1
	25×8	1
	$\frac{25 \times 8}{100}$	1
	2 Hours	1 ⑤
		10

Q.No	Answer	Marks
(04) i.	$\frac{40}{80} \times 360$	1
	180	1 ②
ii.	$\frac{80}{40} \times 50$	1
	100^0	1 ②
iii.	$360 - (120 + 100)$	1
	140^0	1
	$\frac{40}{80} \times 140$	1
		1 ④
iv.	$\frac{2}{12} \times 360$	1
	60^0	1 ②
		10

Q.No	Answer	Marks
(05) a. i. Plotting points		②
ii. $\frac{9}{25}$		①
iii.	Second drawn / First drawn	②
b. i. $\frac{2}{5}$		1
		1
		1 ③
ii. $\frac{25}{25} - \frac{9}{25}$ or $\frac{6}{25} + \frac{6}{25} + \frac{4}{25}$		1
$\frac{16}{25}$		1 ②
		10

Third Term Test - 2023
Mathematics Answer sheet
Paper II - Part A

Grade 10

Q.No	Answer	Marks	
01. i.	$150000 \times \dfrac{8}{100}$	1	
	Rs. 12000	1	2
ii.	$500000 \times \dfrac{4}{100}$	1	
	Rs. 20000	1	
	Rs. 36000 - 20000		
	Rs. 16000	1	
	Rs. $16000 \times \dfrac{8}{100}$	1	
	Rs. 200000	1	
	Rs. 500000 + 500000 + 200000	1	
	Rs. 1200000	1	
	Rs. 1200000 ÷ 12		
	Rs. 100000	1	8
			10
(02) i.	$2x + y = 6100$	1	
	$x = 2y + 300$	1	2
	$x - 2y = 300$		
ii.	$4x + 2y = 12200$	1	
	$5x = 12500$		
	$x = 2500$	1	
	$2500 - 2y = 300$	1	
	$y = 1100$	1	
	Price of a Hand bag = Rs. 2500	1	5
	price of an umbrella = Rs. 1100	1	
b.	$\dfrac{3-x}{2} = \dfrac{3}{6}$	1	
	$3 - x = 1$	1	
	$x = 2$	1	③
			10
(03) a. i.	- 4	1	
	correct axis	1	
	plotting points	1	
	Smooth curve	1	3
b. i.	$x = 0$	1	2
ii.	$0 < x < 2$	1	
iii.	$y = x^2 - 2$	1	2
iv.	$(0, -2)$	2	
			10
(04) i.	5g	1	
ii.	mid value column		
	8 , 14 , 20 , 26 , 32 , 38 , 44	1	
	fx column		
	-36, -30 , 0 , 36 , 36 , 24	1	
	$\Sigma fx = 66$	1	
	mean $= 20 + \dfrac{66}{30}$	1	
	= 22.2	1	
	= 22	1	6
iii.	22 x 30 x 4	1	
	2640 g	1	
	2640 > 2500 or 2.64 > $2\dfrac{1}{2}$		
	∴exceeds $2\dfrac{1}{2}$ kg	1	3
			10

Q.No	Answer	Marks	
(05) a.	$\dfrac{x\,(x+5)}{22} = 12$	1	
	$x^2 + 5x = 24$		
	$x^2 + 5x - 24 = 0$	1	
	$x^2 + 8x - 3x - 24 = 0$	1	
	$(x+8)(x-3) = 0$	2	
	$x+8 = 0$, $x-3 = 0$	1	
	$x = 3$ cm		
	$x = -8$ .is not suitable	1	7
b.	$-2x \geq -4$	1	
	$x \leq 2$	1	
	$\{2 , 1\}$	1	3
			10
(06) a. i.	70^0 or 160^0	1	
	600km or 800 km	1	2
ii.	obtaining 110^0	1	
	$P\hat{Q}R = 90^0$	1	2
b.	angle of depression 35^0	1	
	angle of elevation 55^0	1	
	LTP = 35^0 or T drawing the perpendicular TL from T	1	
	Taking 300 km ⟶ 3 cm	1	
	scale height	1	
	actual height	1	6
			10
(07) i.	$2n + 3$		2
	5 , 7 , 9	1	
ii.	$2 \times 7 + 3$	1	
	17	1	2
iii.	$2n + 3 = 13$	1	
	$2n = 10$		
iv.	$S_n = \dfrac{n}{2}(a + l)$ n = 5	1	
		1	
	$\dfrac{7}{2}(5 + 17)$	1	
	= 77	1	
	77 x 5 = 385	1	4
			10
(08) i.	AB	1	
	60^0	1	contructing or equilateral triangle ABC
	perpendicular of AB	1	
	point C	1	4
ii.	angle bisector	1	
	centre O	1	
	circle	1	3
iii.	since AC = CB		
	CAB = CBA = 60^0	1	
	∴ ACB = 60^0	1	
	∴ AC = CB = AB		
	∴ ABC is an equilateral triangle .	1	3
			10
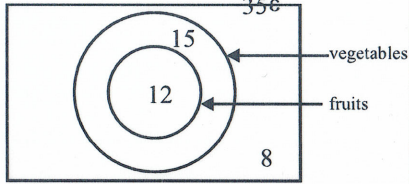
Q.No	Answer	Marks	
(09)	a. $\frac{22}{7} \times 14 \times 14 \times 20$	1	
	$80 \times l \times 14$	1	
	$\frac{22}{7} \times 14 \times 14 \times 20 = 80 \times l \times 14$	1	
	$l = \frac{22 \times 14 \times 14 \times 20}{7 \times 80 \times 14}$	1	
	$l = 11 cm$	1	5
	b. lg 24.3 + lg 5.32 - lg 3.86	1	
	$1.\underset{1}{3838} + 0.7259 - 0.\underset{1}{5866}$	2	
	1. 5231	1	
	33.35	1	5
			10
(10)	i. producing BA	1	
	marking y	1	
	marking z	1	3
	AB = DC (opposite sides of the ▱)	1	
	AB = AX (data)		
	∴ AX = CD	1	
	XAY = YDC (XB // DC, alternate angle)		
	XYA = DYC (vertically opposite angle)	1	
	∴ AXYΔ = YDC Δ (AAS) 1	5	
	ii. $AY = \frac{1}{2} AD$		
	$BZ = \frac{1}{2} BC$	1	
	AD = BC (opposite sides of the ▱)		
	AY = BZ		
	∴ AY // BZ		
	∴ AYZB is a ▱'	1	2
			10
(11)	i. $A\hat{C}D = \frac{1}{2} A\hat{O}D$ (angle subtended by an arc at the centre is twice of the angle subtended by the same arc on the remaining part of the circle)	1	
	$A\hat{B}C = A\hat{O}D$	1	2
	∴ $A\hat{C}D = \frac{1}{2} A\hat{B}C$		
	ii. OC = OB (radii of the same circle)		
	∴ $O\hat{B}C = O\hat{C}B$	1	
	$O\hat{C}B = D\hat{O}C$ (alternate angles)	1	
	$O\hat{B}C = A\hat{O}D$ (corresponding angles)	1	
	∴ $D\hat{O}C = A\hat{O}D$	1	4
	∴ DO is the bisector of the $A\hat{O}C$		
	iii. $A\hat{C}D = \frac{1}{2} D\hat{O}A$		
	$D\hat{A}C = \frac{1}{2} D\hat{O}C$	1	
	$D\hat{O}C = A\hat{O}D$		
	∴ $D\hat{C}A = D\hat{A}C$	1	2
	∴ AD = DC		
	iv. $A\hat{C}B = 90^0$ (angle in the semi circle)	1	2
	∴ AXO = 90° (D // BC corresponding angles		
	∴ AX is perpendicular to DO		

Q.No	Answer	Marks	
(12)			
	naming sets	1	
	i. 12 , 15 , 8 , 35	4	5
	ii. 8		1
	iii. 12		1
	iv. for shading	2	
	people who bought vegetables only	1	3
			10