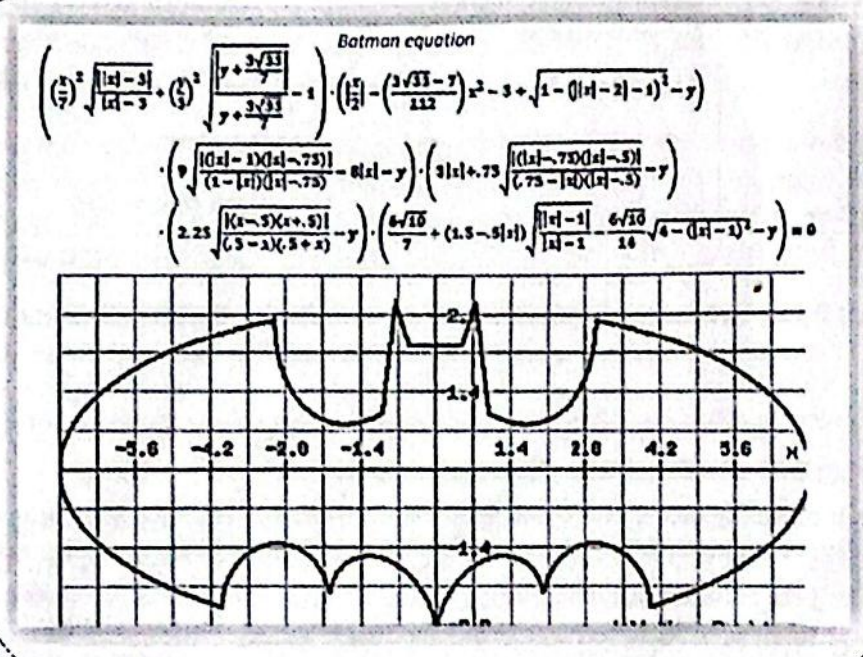
Department of Examinations-Sri Lanka

G.C.E(O/L) Examination - 2024 (2025)

32 – Mathematics

Marking Scheme



This document has been prepared for the use of Marking Examiners. Some changes would be made according to the views presented at the Chief Examiners' Meeting

Amendments are to be included.

Part A

Answer all questions on this question paper itself.

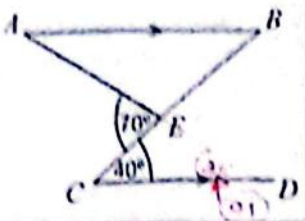
(Take the value of π as $\frac{22}{7}$)

1. It is estimated that six men will take eight days to paint the walls of a house. If it is required to complete this task in three days, how many more men need to be engaged?

10 ——————— ②

Amount of work = 6×8 man days ——————— 1

2. Find the magnitude of $B\hat{A}E$ based on the information given in the figure.



30^0 ——————— ②

$A\hat{B}C = 40^0$ ——————— 1

3. Simplify: $\frac{2}{3x} + \frac{5}{6x} - \frac{7}{12x}$

$\frac{11}{12x}$ ——————— ②

$\frac{8}{12x} + \frac{10}{12x} - \frac{7}{12x}$ ——————— 1

4. From the shapes given below, select and underline the one that cannot be the shape of a face of a right prism with a triangular cross section.

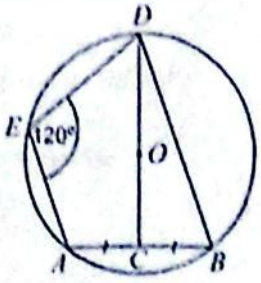
(i) Square (ii) Rhombus (iii) Rectangle ——————— ②

5. Based on the information in the given pie chart, if the number of students who study Drama & Theatre is 30, how many students study Dancing?

Number of students studying dancing = 105 —— ②

Cental angle of the seetor representing dancing $= 70^0$ ——————— 1

6. O is the centre of the given circle. The chord AB is bisected by the straight line DOC. Find the magnitude of $C\hat{D}B$.



30^0 ——————— ②

$A\hat{C}D = 90^0$ or $B\hat{C}D = 90^0$ or $A\hat{B}D = 60^0$ ——————— 1

7. Find the factors: $2x^2 - 18$

$2(x-3)(x+3)$ ——————— ②

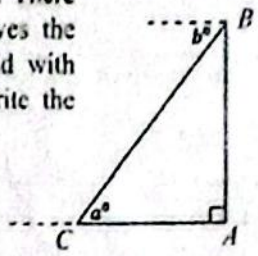
$2(x^2 - 9)$ ——————— 1

8. Taking that $10^{0.6375} = 4.34$, find the value of lg 43.4.

1.6375 ——————— ②

$43.4 = 10^{0.6375} \times 10$ ——— 1

9. In the given figure, AB is a vertical tree and there is a bird at point B. There is a child at point C. Moreover AC is horizontal. If the child observes the bird with an angle of elevation of $a°$ and the bird observes the child with an angle of depression of $b°$, represent these angles in the figure. Write the relationship between a and b. (Disregard the height of the child.)



Marking both a degrees and b degrees in the figure ——— ①

$a = b$ ——————— ①

10. The height of a solid right circular cylinder is three times its base radius r. How many times of the paint required to paint only the base is needed to paint the curved surface of the cylinder completely? (The area of the curved surface of a solid right circular cylinder of base radius r and height h is $2\pi rh$.)

6 times ——————— ② ①

Area of the curved surface $= 2\pi r\,(3r)$

or ——————— 1

Area of the base $= \pi r^2$

11. Find the probability of obtaining 10 as the sum of the two digits on the face that falls downwards when an unbiased tetrahedral die with its four faces marked as 1, 3, 5, 7 is tossed up twice.

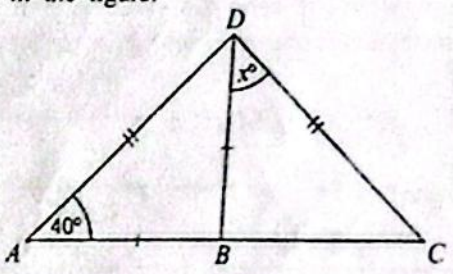
$\frac{3}{16}$ ——————— ②

Represent in a grid — ①

Tree diagram — ①

correct coordinates — ①

12. Find the value of x based on the information given in the figure. Here, ABC is a straight line.



$x = 60°$ ——————— ②

$A\hat{D}B = 40°$ or $D\hat{C}B = 40°$ ——— 1

13. If ε = {Integers between 0 and 7},
A = {Prime numbers between 0 and 7},
B = {Multiples of 2 between 0 and 7},
select and underline the correct statement from the statements given below.

(i) $A \cup B = \varepsilon$

(ii) $A \cap B = \{2, 4\}$

(iii) $n(A) = 3$ ——————— ②

If using diagram ②

14. Simplify: $3x^2 \times 2y \div 8xy$

$\frac{3x}{4}$ ——————— ②

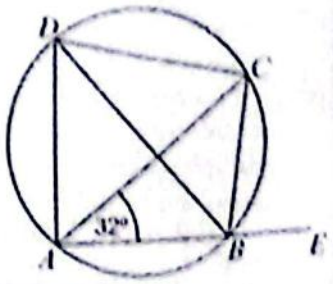
$3x^2 \times 2y \times \frac{1}{8xy}$ ——————— 1

15. The second term of a geometric progression is -6 and the third term is -12. What is the fifth term of this progression?

$ar = -6$ or $ar^2 = -12$ or $r = 2$ ——————— ①

-48 ——————— ①

16. A cyclic quadrilateral $ABCD$ is shown in the figure. $A\hat{D}C$ is bisected by BD. The side AB is produced to E. Find the magnitude of $C\hat{B}E$, based on the information in the figure.



64° ——————— ②

$B\hat{D}C = 32^\circ$ or $A\hat{D}C = 64^\circ$ or $A\hat{D}C = C\hat{B}E$ ——— 1

17. Find the least common multiple of the following algebraic terms:
$6x^2$, $5xy$, $2y^2$

$30x^2y^2$ ——————— ②

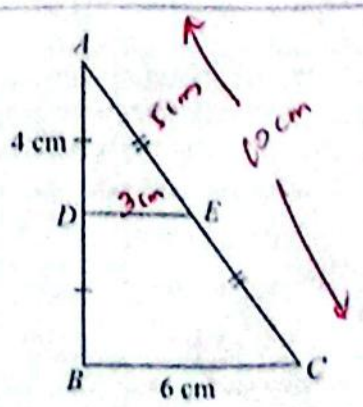
$6x^2 = 2 \times 3 \times x \times x$
$5xy = 5 \times x \times y$
$2y^2 = 2 \times y \times y$ ——————— 1 (All three written as products of factors should be correct)

18. The area of the triangular cross section of a right prism is 616 cm^2. The volume of a right circular cylinder of the same height as the prism, and base radius r, is equal to the volume of the prism. Find the value of r in centimetres. (The volume of a right circular cylinder of base radius r and height h is $\pi r^2 h$.)

$\pi r^2 \times h = 616 \times h$ ——————— ①

$r = 14$ ——————— ①

19. The midpoints of the sides AB and AC of the given triangle ABC are D and E respectively and $A\hat{D}E = 90^\circ$. Find the perimeter of the quadrilateral $BCED$ in centimetres.



18 cm ——————— ②

$DE = 3$ cm or $AE = 5$ cm ——— 1

or $AC = 10$ cm

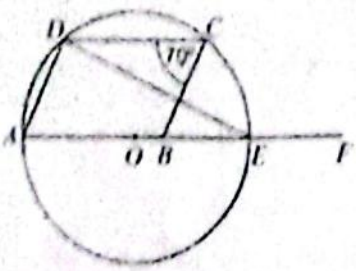
20. Find the equation of the straight line that passes through the points (4, 6) and (6, 9) in the Cartesian plane.

$m = \frac{9-6}{6-4}$ or $6 = m \times 4 + c$ ——— ①

$y = \frac{3}{2}x$ ——— ①

only $c = 0$ — (00)
If c found with m — (01)

21. The centre of the given circle is O. Moreover, $ABCD$ is a parallelogram and $AOBEF$ is a straight line. Find the magnitude of $D\hat{E}F$ based on the information in the figure.



$160°$ ——— ②

$D\hat{A}B = 70°$ or $A\hat{D}E = 90°$ or $C\hat{B}E = 70°$ ——— 1

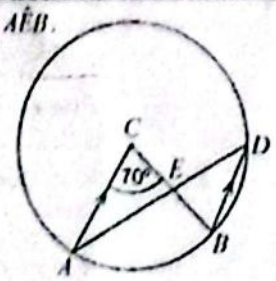
22. Raman deposited a certain amount of money for two years in a finance company that pays an annual interest rate of 10%, with the interest compounded annually. The interest that she received for the second year only is 660 rupees and the total amount she received at the end of two years is 7260 rupees. Find the amount she deposited.

$x \times \frac{110}{100} \times \frac{110}{100} = 7260$

Rs. 6600 or $7260 \times \frac{100}{110} \times \frac{100}{110}$ ——— ①

Rs. 6000 ——— ①

23. In the given circle, C is the centre and $AC \parallel BD$. Find the magnitude of $A\hat{E}B$.



$A\hat{E}B = 105°$ ——— ②

$C\hat{B}D = 70°$ or $A\hat{D}B = 35°$ ——— 1

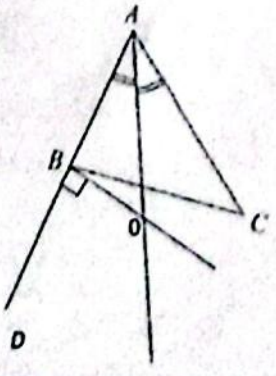
24. Find the **negative integral** solutions of the inequality $3x + 11 > 2$.

$-3, -2, -1$ — (00)
$x > -3$ — (01)

$3x > -9$ ——— ①

-1 and -2 ——— ①

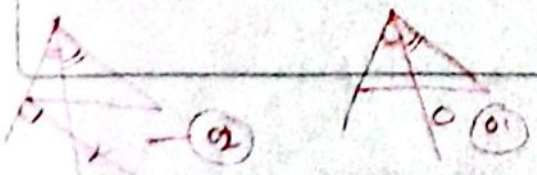
25. ABC is an acute triangle as given in the figure. This incomplete sketch has been drawn to find the centre O of the circle that touches the side AB at the point B and also touches the side AC. Using the knowledge on loci, complete the sketch and mark O.



Drawing a perpendicular to AD at B ——— ②

Marking O on the angle bisector outside the triangle —— 1

50/50



Part B

Answer all questions on this question paper itself.

1. Janaka pays income tax of 6% on the amount that he earns above 100 000 rupees, when his monthly salary is more than this amount. In a certain month, he puts aside for food, $\frac{1}{6}$ of the amount he received after paying the tax. He puts aside $\frac{3}{5}$ of the remaining amount for other expenses.

(i) What fraction of the amount Janaka received remains after he puts aside $\frac{1}{6}$ of it for food?

$1-\frac{1}{6}$

$=\frac{5}{6}$ ——— 1 (1)

(ii) What fraction of the amount he received remains with Janaka after he puts aside an amount for food and for other expenses?

$\frac{5}{6}\times\frac{3}{5}$ ——— 1 Remaining fraction $=1-\left(\frac{1}{6}+\frac{1}{2}\right)$ ——— 1

$=\frac{3}{6}=\frac{1}{2}$ $=\frac{2}{6}=\frac{1}{3}$ ——— 1 (3)

(iii) If the amount that remains now is 39 600 rupees, find separately how much he received after paying the tax and how much he put aside for food.

$\frac{1}{3}\longrightarrow$ Rs. 39600

Amount received after paying tax $=$ Rs. 39600×3 $=$ Rs. 118800 ——— 1

Amount set aside for food $=$ Rs. $118800\times\frac{1}{6}$ $=$ Rs. 19800 ——— 1 (2)

(iv) What was his salary before paying the tax?

94% of the amount on which tax is charged = Rs. 18800 ∴ salary = Rs. 120000 ——— 1

Amount on which tax is charged $=$ Rs. $18800\times\frac{100}{94}$ ——— 1

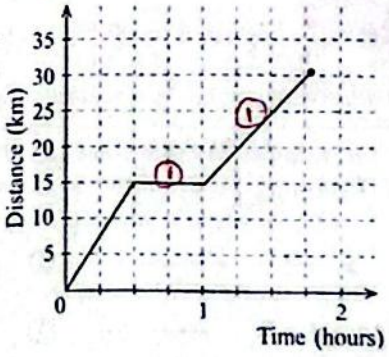
$=$ Rs. 20000 (2)

(v) At some stage, due to the limit over which income tax is charged being increased, if Janaka doesn't have to pay tax, and if the amount he spends on food remains the same as before, how much does he now spend on food as a percentage of his salary?

$\frac{19800}{120000}\times100\%=16.5\%$ 1+1 (2)

10/10

2. (*a*) Saman travels from his home to a friend's home in 30 minutes, at a uniform speed. He spends 30 minutes at his friend's home and returns to his home along the same road in 45 minutes, travelling at a uniform speed.



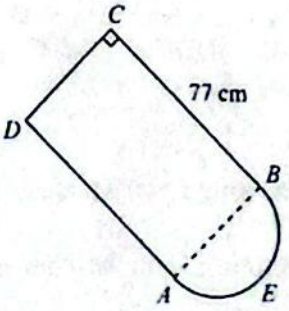
(i) An incomplete distance-time graph drawn to represent this information is shown here. Complete the graph based on the above information. 1 + 1

(ii) Find the speed at which Saman travels back home, in kilometres per hour.

$\frac{15}{3/4}$ ——— 1

$=20\text{km h}^{-1}$ ——— 1 (2)

(*b*) This figure consists of a semicircular part *AEB* of diameter 28 cm and a rectangular part *ABCD*, with the length of *BC* equal to 77 cm.



(i) Find the perimeter of this composite figure.

Arc length of $AB=\frac{22}{7}\times14=44$ cm ——— 1

Perimeter $=77\times2+28+44=226$ cm ——— 1+1 (3)

(ii) How many times of the area of the semicircular part is the area of the rectangular part?

Area of the rectangle $=77\times28\text{ cm}^2$

Area of the semicircular part $=\frac{1}{2}\times\frac{22}{7}\times14\times14$ ——— 1

$\frac{77\times28}{\frac{1}{2}\times\frac{22}{7}\times14\times14}$ ——— 1

∴ 7 times ——— 1 (3)

10/10

3. Kamal rented his house for a year at 8000 rupees per month and obtained the total amount in a single payment. The urban council to which the house belongs has assessed the annual value of the house as 12000 rupees and charges 18% for a year as rates.

(i) How much has to be paid as rates for the house for the year? Rs. $12000 \times \frac{18}{100}$ —— 1

= Rs. 2160 —— 1 (2)

(ii) 10% of the amount obtained by renting the house is spent on house maintenance. How much money remains with Kamal after paying the rates and spending on maintenance?

Maintenance cost = Rs. $8000 \times 12 \times \frac{10}{100}$ —— 1

= Rs. 9600

Total cost = Rs. 9600 + 2160 —— 1

= Rs. 11760

Remainder = Rs. 96000 − 11760

= Rs. 84240 ———— 1 (3)

(iii) Now Kamal adds a certain amount to the amount remaining with him, and invests it to buy 50 rupee shares of a company. The company pays annual dividends of 2.50 rupees per share. He receives 6000 rupees as the dividend income at the end of a year.

(a) How many shares did Kamal buy?

$\frac{6000}{2.5} = 2400$ ———— 1 (1)

(b) Write the extra amount Kamal added to invest in the company, as a percentage of the total amount he invested in the company.

Amount invested in shares = Rs. 50 × 2400 = Rs. 120000 ——— 1

Extra amount = Rs. 120000 − 84240 ——— 1

= Rs. 35760 ———— 1

Extra amount as a percentage = $\frac{35760}{120000} \times 100\%$ ———— 1

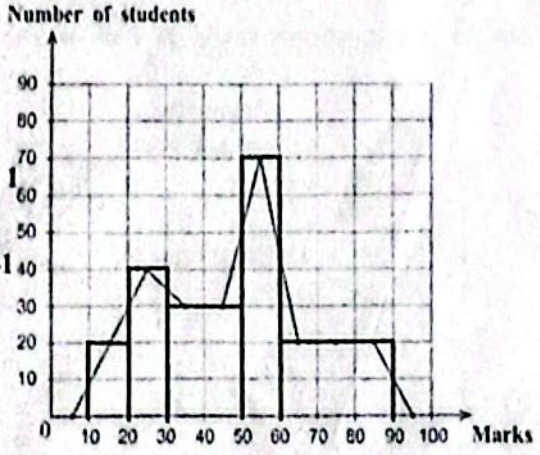
= 29.8% ———— 1 (4)

10/10

4. A frequency polygon and an incomplete grouped frequency table drawn based on the marks obtained by a group of students for a test are given below. In this table, the interval 10 – 20 denotes 10 or more than 10 and less than 20.

Marks	Number of students	Cumulative frequency
10 – 20	20	20
20 – 30	40	60
30 – 50	60	120
50 – 60	70	190
60 – 90	60	250

1+1+1



(i) In the table, fill in the blanks in the column denoting the number of students, according to the frequency polygon. (3)

(ii) On the given frequency polygon, draw the histogram corresponding to these marks.

30 – 50 column 1

60 – 90 column 1

Remaining columns 1 (3)

(iii) Complete the cumulative frequency column in the table. (2)

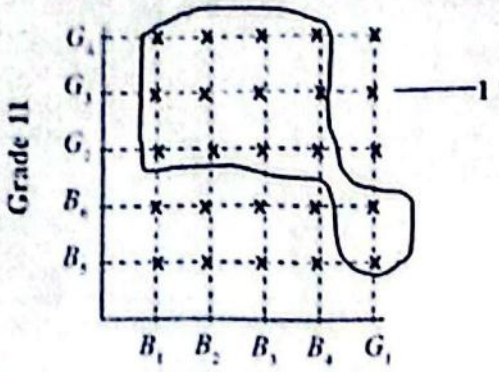
(iv) Find the probability of a student picked at random from this group of students being someone who has obtained 50 marks or more.

Number of students who got 50 or more marks = 130 ——— 1

Probability of getting 50 or more marks = $\frac{130}{250}$ ——— 1 (2)

10/10

5. In a school, for a certain sport, there are four boys and a girl in the grade 10 team and two boys and three girls in the grade 11 team. For the first round of a competition between the two teams, a child from grade 10 and a child from grade 11 are picked randomly.



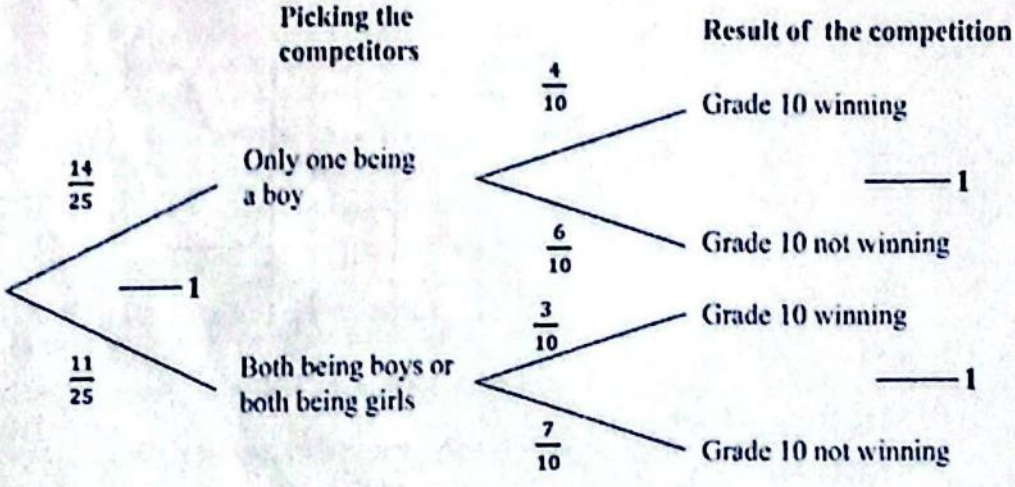
(i) By considering that the boys are denoted by B_1, B_2, B_3, B_4, B_5, B_6 and the girls are denoted by G_1, G_2, G_3, G_4, mark the sample space relevant to randomly picking two children on this grid with the symbol 'X'. (1)

(ii) On the grid, encircle the event of exactly one boy being picked for the first round of the competition and find its probability. (3)

Encircling ——— 1

Probability $= \frac{14}{25}$ ——— 2

(iii) It is given that when the two participants in the first round of the competition are selected in the above manner, if exactly one of the two is a boy, the probability of Grade 10 winning is $\frac{4}{10}$ and if either both are boys or both are girls, the probability of Grade 10 winning is $\frac{3}{10}$. Accordingly, write the relevant probabilities on the branches of the tree diagram given below, to predict whether Grade 10 wins or not.



(3)

(iv) Calculate the probability of Grade 10 not winning in this competition round.

$\frac{14}{25} \times \frac{6}{10} + \frac{11}{25} \times \frac{7}{10} = \frac{161}{250}$ 1+1+1 (3)

10/10

32 – Marking Scheme
Mathematics II

1. A stock of television sets worth 84 000 rupees each is available for sale. The method used by Ruvini to buy a television set and the method used by Manel to buy another television set is given below.

Ruvini: A loan of 84 000 rupees is taken from a finance company for a year at an annual simple interest and the television set is bought. At the end of the year, the loan is settled by paying the loan amount and interest of 10 920 rupees.	**Manel**: The television set is bought on hire purchase with the amount and interest to be paid in 12 equal monthly installments. Here, the interest is calculated on the reducing balance. When the payment of the installments is completed in a year, the same total interest of 10 920 rupees that is paid by Ruvini has been paid.

Find separately the annual interest rates at which the interest is paid by the two of them and show that the annual interest rate charged in the hire purchase method is more than the annual interest rate charged by the finance company.

Question Number	Marking Scheme	Marks	Other details
1.	Interest rate paid by Ruvini for a year $= \frac{10920}{84000} \times 100\%$	1	
	$= 13\%$	1	
	Value of an installment without the interest $= \frac{84000}{12}$	1	
	$= \text{Rs. } 7000$	1	
	Number of month units $= \frac{12}{2}(12+1)$	1	
	$= 78$	1	
	Interest for a month unit $= \frac{10920}{78}$	1	
	$= \text{Rs. } 140$		
	The annual interest rate that Manel pays $= \frac{140}{7000} \times 12 \times 100\ \%$	1	
	$= 24\%$	1	
	Since $13\% < 24\%$ the interest rate charged in the higher purchase method is more than the interest rate charged by the finance company	1	10

without inequal by sign if the statement is correct – (01)

$7000 \times \frac{x}{100} \times \frac{1}{12} \times 78 = 10920$

2. An incomplete table showing the y-values corresponding to several x-values of a quadratic function of the form $y = f(x)$, within the interval $-2 \leq x \leq 4$ is given below.

x	-2	-1	0	1	2	3	4
y	-5	0	3	4	...	0	-5

(i) By considering the symmetry of the quadratic function, find the value of y when $x = 2$.

(ii) Using the standard system of axes and a suitable scale, draw the graph of the quadratic function on the given graph paper, according to the table given above.

(iii) (*a*) Write the coordinates of the two points of intersection of the graph and the x-axis.

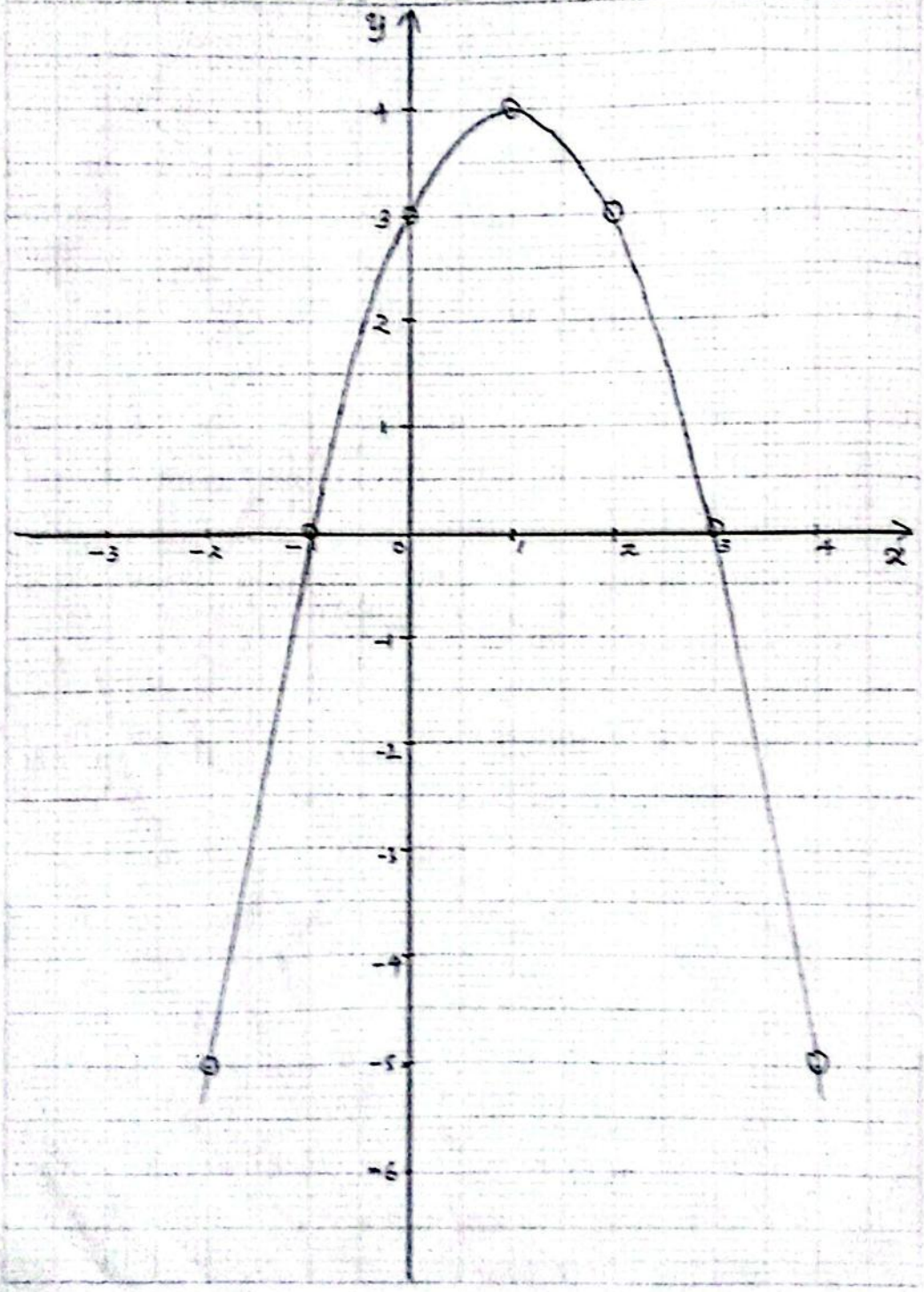
(*b*) By considering the coordinates of the two points mentioned in the above part, write the given quadratic function in the form $y = -(x + p)(x + q)$.

(iv) Let us take that the line $y = 1$ intersects the graph at the points A and B.

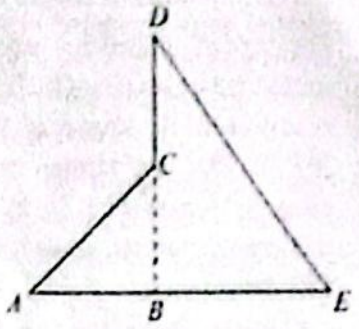
(*a*) Write the interval of values of x on which $y > 1$.

(*b*) Obtain the length of AB to the nearest first decimal place.

Question Number			Marking Scheme	Marks			Other details
2.	(i)		The value of $y = 3$	1	(1)		
	(ii)		Correct scale	1			
			5 correct points	1			
			Smooth curve	1	(3)		
	(iii)	(a)	$(-1,0)$ and $(3,0)$	1+1			
		(b)	$y = -(x + 1)(x - 3)$	1	(3)		
	(iv)	(a)	$-0.7 < x < 2.7$ (± 0.1)	1+1			If only one value and inequality is correct, 1 mark
		(b)	Length of $AB = 3.4$ (± 0.2) units 6.8 cm (±0.2) — (01) only 6.8 — (00)	1	(3)	10	between -0.7 and 2.7 — (02)

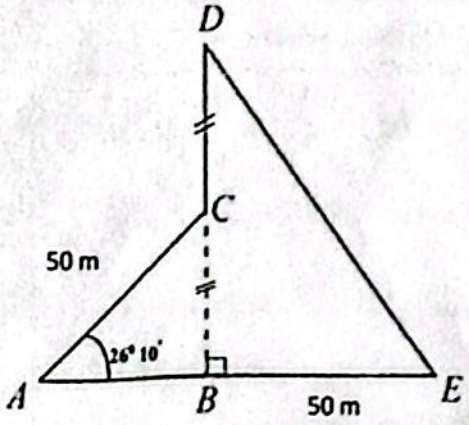


3. In a competition, the competitors had to run up an inclined plane, climb up a vertical ladder and then slide down another inclined plane. The side view of the two inclined planes and the vertical ladder used for this are denoted by AC, DE and CD respectively in the figure. Here, ABE is a horizontal plane, $AC = BE = 50$ m, $C\hat{A}B = 26° 10'$, BCD is perpendicular to ABE, and $DC = BC$.

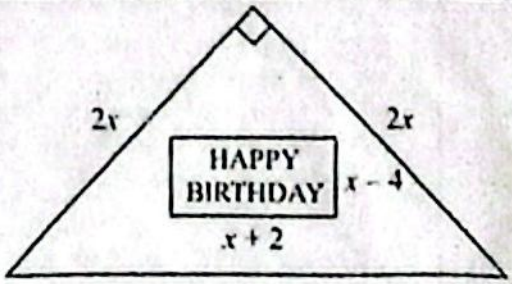


Copy the given figure in your answer script and include the given information in it.

Using trigonometric ratios, show that the difference between the incline of DE (that is $D\hat{E}B$) and the incline of AC (that is $C\hat{A}B$) is more than 15°.

Question Number	Marking Scheme	Marks	Other details
3.		1+1+1	For correctly marking $26°10'$ — 1 50 m — 1 (Indicating 50m in both place places or indicating equality of the two lengths with 50 m indicated in one place)
	In $\triangle ABC$,		
	$\sin 26°10' = \frac{BC}{AC}$	1	$DC = CB$ and $90°$ — 1
	$50 \times 0.4410 = BC$	1	
	$\therefore BC = 22.05$ m	1	
	In $\triangle DEB$,		
	$\tan D\hat{E}B = \frac{DB}{BE}$		
	$= \frac{2 \times 22.05}{50}$	1	
	$= 0.8820$	1	
	$D\hat{E}B = 41° 25'$	1	
	Difference between $D\hat{E}B$ and $C\hat{A}B$ $= 41° 25' - 26°10'$		
	$= 15° 15'$		
	Since $15° < 15° 15'$		
	the difference between the incline of DE and the incline of AC is more than 15°.	1	10

4. The top of a birthday cake is in the shape of a right angled isosceles triangle. Its two equal sides are of length $2x$ cm each. As shown in the figure, the words 'HAPPY BIRTHDAY' are written on a rectangular piece of white icing of length $(x + 2)$ cm and breadth $(x - 4)$ cm. The remaining portion is decorated in pink and is of area 132 cm^2.



(i) Show that x satisfies the equation $x^2 + 2x - 124 = 0$ and find the value of x to the nearest centimetre. (Take the value of $\sqrt{5}$ to be 2.24)

(ii) Show that the length of the longest side of the top of the cake is given by $2\sqrt{2}x$ and show that this length is greater than 28 cm. (Take the value of $\sqrt{2}$ to be 1.41)

Question Number	Marking Scheme	Marks			Other details
4. (i)	Area of the right angled triangle $= \frac{1}{2} \times 2x \times 2x$	1			
	$= 2x^2$				
03	Area of the rectangle $= (x + 2)(x - 4)$	1			
	$= x^2 - 2x - 8$				
	$\therefore 2x^2 - (x^2 - 2x - 8) = 132$	1			$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ OR Substitute Value — (01)
	$x^2 + 2x - 124 = 0$				
	$(x + 1)^2 = 124 + 1$	1			
	$x + 1 = \pm\sqrt{125}$				
04	$x + 1 = \pm 5\sqrt{5}$	1			
	$x = -1 + 5\sqrt{5}$ $(\because x > 0)$	1			
	$x = -1 + 5\,(2.24)$				
	$x = 10.2$ cm				
	$\therefore x \approx 10$ cm	1	(7)		
(ii)	Length of longest side of the top $= \sqrt{(2x)^2 + (2x)^2}$	1			$2 \times 1.41 \times 10.2$ 28.764
	$= 2\sqrt{2}x$ cm				
	Length $= 2(1.41)(10)$cm	1			
	$= 28.2$ cm				
	Since $28.2 > 28$ the length of the longest side is greater than 28 cm.	1	(3)	(10)	only inequality (01)

5. Packs of 10 small plates each and packs of 5 large plates each were bought to serve sweetmeats to the adults and children who attended a party. The price of a pack of small plates was 150 rupees and the price of a pack of large plates was 120 rupees. The total number of plates that were bought was 200 and the total cost of these plates was 3720 rupees.

(i) By taking the number of packs of small plates bought as x and the number of packs of large plates bought as y, construct a pair of simultaneous equations and by solving them, find separately the number of packs of small plates and the number of packs of large plates that were bought.

(ii) Each small plate had the same number of sweetmeats and each large plate had two sweetmeats more than a small plate. If the total number of sweetmeats that were served was 1160, find the number of sweetmeats that a small plate had.

Question Number	Marking Scheme	Marks		Other details
5. (i)	$10x + 5y = 200$ ——— (1)	1		If answer is wrong and then substitute it in the equation — 01
	$150x + 120y = 3720$ ——— (2)	1		
	(1) $\times 15$ $150x + 75y = 3000$ ——— (3)			
	(2) − (3) $45y = 720$	1		
	$y = 16$	1		
	Substituting $y = 16$ in (1)			
	$10x + 5 \times 16 = 200$	1		
	$10x = 120$			
	$x = 12$	1		
	Number of packs of small plates = 12 Number of packs of large plates = 16	1	7	
(ii)	Let us take the number of sweetmeats on a small plate as n			For $120n$ —1
	$120n + (n + 2)80 = 1160$	1+1		For $(n + 2)80$ -1
	$n = 5$		3	
	Number of sweetmeats on a small plate is 5.	1		10

6. The frequency table given below provides information related to the number of hires a certain three-wheeler engaged in each week.

Number of hires	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39
Number of weeks	1	3	4	6	5	7	4

(i) Find the mean number of times the three-wheeler was hired a week.

(ii) How many hires can the three-wheeler driver expect in total in 52 weeks?

(iii) Let us take that the average distance of a hire is 5 km. If the three-wheeler driver charged a fee of 100 rupees per kilometre, what can he expect as his income for four weeks?

(iv) What is the minimum number of times the three-wheeler may have been hired in total in the weeks in which the number of times it was hired was less than 20?

Question Number	Marking Scheme	Marks	Other details
6.			x column only 1 mistake – 02 fx column more than 1 mistake – 00 x column – 1 fx column – 2 (disregard one error) $\Sigma fx = 750$ – 1

Number of hires	Number of weeks (f)	Mid value (x)	fx
5-9	1	7	7
10-14	3	12	36
15-19	4	17	68
20-24	6	22	132
25-29	5	27	135
30-34	7	32	224
35-39	4	37	148
	$\sum f = 30$		$\sum fx = 750$

(i) Mean number of hires per week $= \frac{750}{30}$ — 1 — Dividing by 30

$= 25$ — 1 — (6)

(ii) Number of hires in 52 weeks $= 25 \times 52$ — wrong ×52 ans 01

$= 1300$ — 1 — (1)

(iii) Expected income for 4 weeks $= 4 \times 25 \times 100 \times 5$ — 1

$=$ Rs. 50000 — 1 — (2)

(iv) Minimum number of hires $= 1 \times 5 + 3 \times 10 + 4 \times 15$

$= 95$ — 1 — (1) — 10

7. Use only a straight edge with a cm/mm scale and a pair of compasses for the following geometric constructions. The construction lines should be clearly drawn.

(i) Construct a straight line segment AB of length 6 cm. Construct an angle of 60° at B on AB and bisect it.

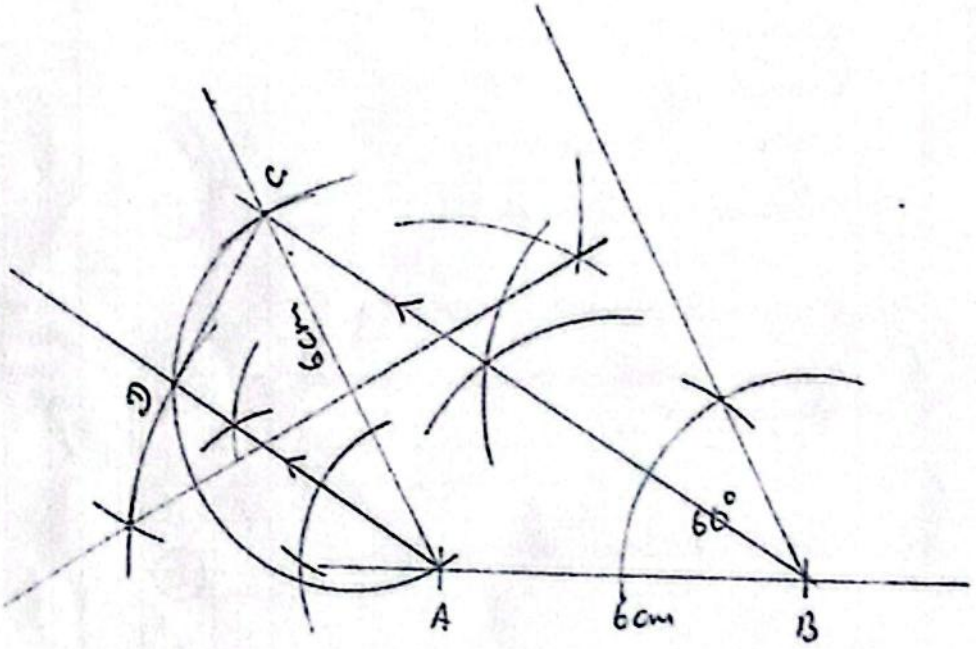
(ii) Construct the isosceles triangle ABC such that $AB = AC$ and $A\hat{B}C = 30^\circ$.

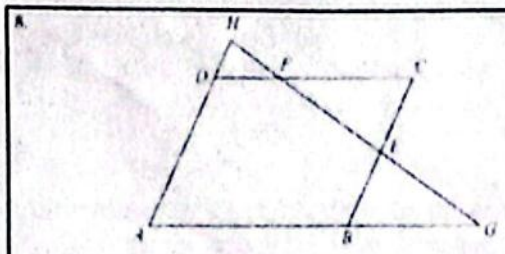
(iii) Construct the perpendicular bisector of AC. Construct a semicircle on the side AC, outside the triangle ABC, such that AC is its diameter.

(iv) Construct a straight line through A parallel to BC such that it intersects the semicircle at D, and join CD.

(v) What is the magnitude of $A\hat{C}D$?

Question Number			Marking Scheme	Marks			Other details
7.		(i)	Constructing AB	1			
			Constructing 60°	1			
			Constructing the angle bisector	2	(4)		
		(ii)	Completing the correct triangle ABC	1	(1)		
		(iii)	Contructing the perpendicular bisector of AC	2			No marks for the perpendicular bisector of another side
			Contructing the correct semicircle corresponding to the correct AC	1	(3)		
		(iv)	Contructing the straight line through A parallel to BC	1	(1)		
		(v)	$A\hat{C}D = 60^\circ$	1	(1)	(10)	


C
6cm
D
60°
A
6cm
B

8. 

In the figure, $ABCD$ is a parallelogram. E is the midpoint of BC and F is a point on DC such that $DF = \frac{1}{3}DC$. Here, the line AB produced meets the line FE produced at G and the line AD produced meets the line EF produced at H.

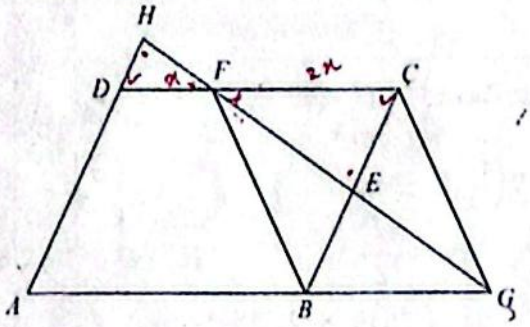
Copy the given figure in your answer script.

(i) Show that $\triangle BGE \equiv \triangle CFE$.

(ii) Join BF and GC and give reasons why $BGCF$ is a parallelogram.

(iii) Show that $\triangle DFH$ and $\triangle BGE$ are equiangular.

(iv) Show that $DH = \frac{1}{4}AD$.

Question Number	Marking Scheme	Marks			Other details
8.					
(i)	In the $\triangle s$ BGE and CFE				
	$BE = EC$ (Datum)				Give marks even if one reason is wrong
	$B\hat{E}G = F\hat{E}C$ (Vertically opposite $\measuredangle$s)	1			
	$B\hat{G}E = C\hat{F}E$ (Alternate $\measuredangle$s)	1			
	$\therefore \triangle BGE \equiv \triangle CFE$ (A.A.S.)	1	(3)		Reason ——1
(ii)	In the quadrilateral $BGCF$,				
	$BG \,//\, FC$ ($\because AB \,//\, DC$)				
	$BG = FC$ ($\because$Congruent$\triangle$s)	1			
	Therefore $BGCF$ is a parallelogram				
	(Pair of opposite sides is parallel and equal)	1	(2)		
(iii)	In $\triangle DFH$ and $\triangle BGE$				
	$D\hat{H}F = B\hat{E}G$ (Corresponding $\measuredangle$s)	1			Reduce 1 mark if the correct reason is not given in at least one place
	$H\hat{F}D = E\hat{G}B$ (Corresponding $\measuredangle$s)	1			
	$H\hat{D}F = E\hat{B}G$ (Remaining $\measuredangle$s)	1	(3)		
	$\therefore \triangle DFH$ and $\triangle BGE$ are equiangular				
(iv)	$\frac{DH}{BE} = \frac{DF}{BG}$ $\frac{HD}{BE} = \frac{HF}{GE} = \frac{DF}{BG}$	1			
	$\frac{DH}{\frac{1}{2}BC} = \frac{\frac{1}{3}DC}{\frac{2}{3}DC}$	1	(2)		
	$DH = \frac{1}{4}AD$ ($\because BC = AD$)			10	

9. Nine small solid metal right pyramids, each with a square base of side length a, and height $2a$, are melted and a solid right circular cylinder of base radius r and height $3r$ is made without any wastage of metal.

Show that $a^3 = \frac{\pi}{2}r^3$.

If $r = 1.725$ cm, by taking $\pi = 3.14$, find the value of a^3 using the logarithms table and obtain the side length a of the base of a pyramid to the nearest centimetre.

From a solid cuboid with a square cross section of side length a, and height $2a$, if one small pyramid with the above mentioned measurements is cut and removed, find the volume of metal that is remaining. (Use the above obtained value of a.)

Question Number	Marking Scheme	Marks	Other details
9.	Volume of a pyramid $= \frac{1}{3} \times a \times a \times 2a$	1	
	$= \frac{2a^3}{3}$		
	Volume of the cylinder $= \pi r^2 \times 3r$		
	$= 3\pi r^3$	1	
	$\therefore 9\left(\frac{2a^3}{3}\right) = 3\pi r^3$	1	
	$a^3 = \frac{\pi r^3}{2}$		
	$a^3 = \frac{3.14 \times (1.725)^3}{2}$		
	$\lg a^3 = \lg(1.57) + 3\lg 1.725$	1	For two correct logarithms — 1
	$= 0.1959 + 3(0.2367)$	1	
	$= 0.1959 + 0.7101$		
	$= 0.9060$	1	
	$\therefore a^3 = \text{antilog}(0.9060)$		
	$= 8.053$ or 8.054	1	
	$a^3 \simeq 8$		
	$\therefore a = 2$	1	
	Volume of the cuboid $= 2a^3$		
	Remaining volume of metal $= 2a^3 - \frac{1}{3}(2a^3)$	1	
	$= \frac{4a^3}{3}$		
	$= \frac{4}{3} \times (2^3)$		
	$= 10.67$ cm^3 or $10\frac{2}{3}$ cm^3	1	10

10. Amala and Sumana decide to read a certain novel durng the holidays. Amala reads 20 pages on the first day and on each day thereafter she reads three pages more than the previous day.
(i) Write the number of pages that Amala reads on the 1st, 2nd and 3rd days respectively
(ii) How many pages does Amala read on the 16th day?
(iii) If she completes the novel on the 16th day, how many pages does the novel consist of?
(iv) How many pages does Sumana read on the first day if she takes 17 days to complete the novel and if on each day after the first, she reads 4 pages more than the previous day?
(v) If the two of them started readng the novel on the same day, on which day do they both read the same number of pages?

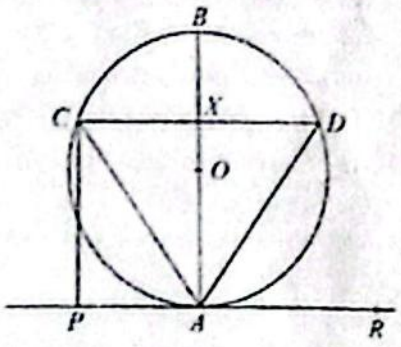
Question Number			Marking Scheme	Marks			Other details
10.	(i)		20, 23, 26	1	(1)		
	(ii)		$T_n = a + (n-1)d$ $T_{16} = 20 + (16-1)3$ $= 65$	1 1	(2)		For the formula or for substituting — 1
	(iii)		$S_n = \frac{n}{2}(a + l)$ $S_{16} = \frac{16}{2}(20 + 65)$ $= 8 \times 85$ $= 680$	1 1	(2)		
	(iv)		$S_n = \frac{n}{2}\{2a + (n-1)d\}$ $680 = \frac{17}{2}\{2a + (17-1)4\}$ $a = 8$	1 1	(2)		For the formula or for substituting — 1
	(v)		Suppose they both read the same number of pages on the n th day. $20 + (n-1)3 = 8 + (n-1)4$ $20 + 3n - 3 = 8 + 4n - 4$ $n = 13$ The two read the same number of pages on the 13 th day	1+1 1	(3)	10	

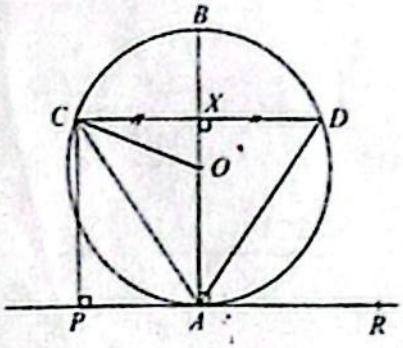
11. In the given figure, AB is a diameter of the circle with centre O and CD is a chord which is bisected at X by AB. Moreover, CP is perpendicular to PAR, the tangent to the circle at A

Copy the given figure in your answer script and join OC.

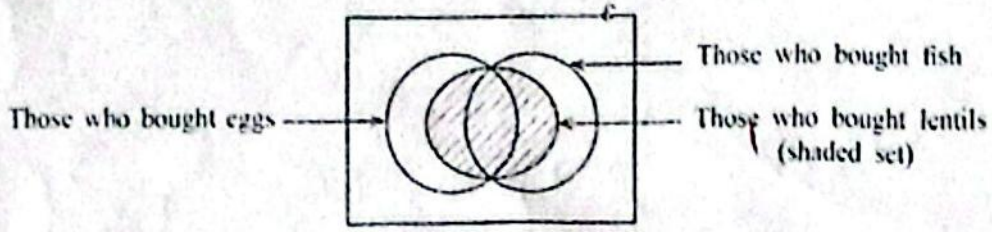
(i) Show that $PACX$ is a cyclic quadrilateral and that the chord AC bisects $P\hat{C}O$.

(ii) State with reasons two angles which are equal to $D\hat{A}R$.



Question Number	Marking Scheme	Marks	Other details
11.		1	Figure with OC joined ——— 1
(i)	$A\hat{X}C = 90°$ (Line joining the midpoint of the chord CD to the centre is perpendicular to the chord)	1+1	For $A\hat{X}C = 90°$ —1 Reason ———1
	$C\hat{P}A = 90°$ (Given)		
	$\therefore O\hat{X}C + C\hat{P}A = 180°$	1	
	$\therefore PAXC$ is a cyclic quadrilateral (Opposite angles are supplementary)		
	$O\hat{A}P = 90°$ (Angle between the radius and tangent)	1	
	$O\hat{A}C = O\hat{C}A$ ($\because OA = OC$)	1	
	$\because O\hat{A}P + A\hat{P}C = 180°, AB \parallel PC$	1	
	$\therefore O\hat{A}C = A\hat{C}P$ (Alternate $\angle$s)	1	Reduce one mark if the reason is not given in one place even
	$\therefore A\hat{C}O = A\hat{C}P$ (Axiom)		
	$\therefore P\hat{C}O$ is bisected by CA	(8)	
(ii)	$D\hat{A}R = A\hat{D}C$ ($PR \parallel CD$, Alternate $\angle$s)		For any two equal angles with reason 1+1
	$D\hat{A}R = A\hat{C}D$ (Angle in the alternate segment)		
	$D\hat{A}R = C\hat{A}P$ ($\because A\hat{C}D = C\hat{A}P$)	1+1 (2)	10

12. An incomplete Venn diagram with information on 100 customers who came to a certain store is shown here.



14 customers did not buy fish, lentils or eggs. 60 customers bought lentils.

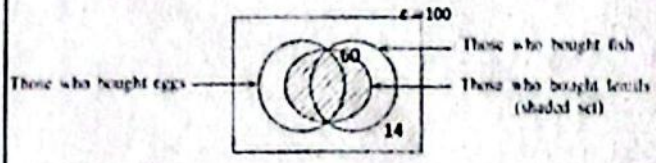
Copy the given figure in your answer script and enter the given information in it.

(i) How many customers bought exactly one of the three items fish, eggs and lentils?

(ii) If the number of customers who bought all these three items is equal to the number of customers who bought exactly two of these items, how many customers bought all three items?

(iii) If the number of customers who bought only eggs and lentils is twice the number of customers who bought only fish and lentils, how many customers bought eggs and lentils?

(iv) If the number of customers who bought fish is 52, how many customers bought only eggs?

Question Number	Marking Scheme	Marks			Other details
12.					
	Copying the figure Marking 100, 60, 14 correctly	1+1+1	(3)		
(i)	100 – (60 + 14) = 26	1 1	(2)		2 marks even if only 26 written
(ii)	30	1	(1)		In the diagram - (01)
(iii)	20 + 30 = 50	1 1	(2)		only answer (01)
(iv)	Number that bought only fish = 52 – (30 + 10) = 12	1			20, 30 should at least be marked in the figure
	Number that bought only eggs = 26 – 12 = 14	1	(2)	10	