



PROVINCIAL DEPARTMENT OF EDUCATION - NORTH WESTERN PROVINCE

SECOND TERM TEST - 2018

MATHEMATICS - I

Grade 11

Two Hours

Name / Index No. :

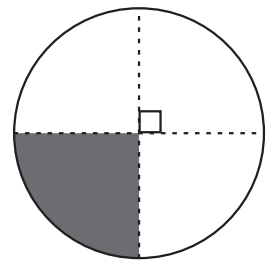


Answer all questions

2 marks for each questions of part A and 10 marks for each questions of Part B

Part A

01. A circle with circumference of 88cm is given in the figure.
Find the arc length of the shaded part.

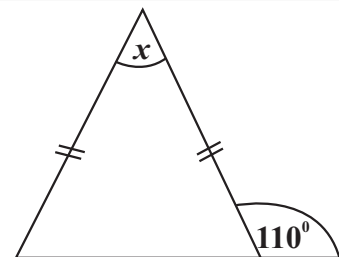


02. If $10^{-2} = 0.01$, fill in the blanks of $\lg_{10} \dots = \dots$

03. What is the value of $\sqrt{18}$ to the nearest whole number?

04. Simplify $\frac{5}{3a} - \frac{3}{4a}$

05. According to the information given in the figure,
Find the value of x

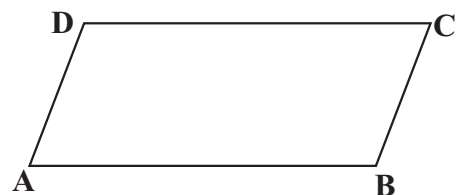


06. Factorize; $x^2 - x - 20$

07. Of the given figure, ABCD is a parallelogram. Fill in the blanks.

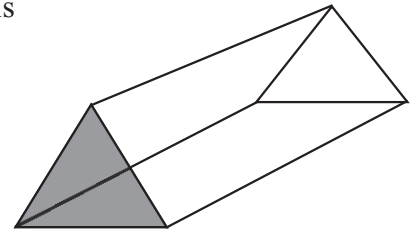
(i) $AD \parallel \dots$

(ii) $\dots = \hat{A}BC$

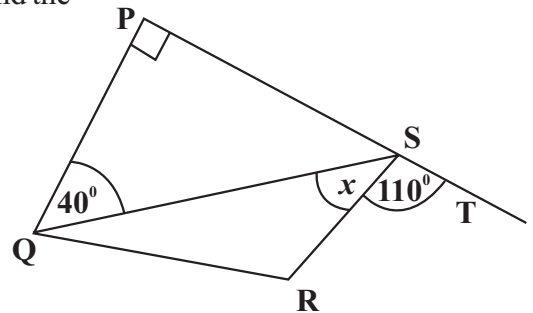


08. There are sufficient food for 10 days for the 15 soldiers stayed in camp. For how many days this food storage is sufficient for 25 soldiers ?

09. The volume of a right prism with the cross sectional area of 12.5cm^2 is 125cm^3 . Find the length of the prism.



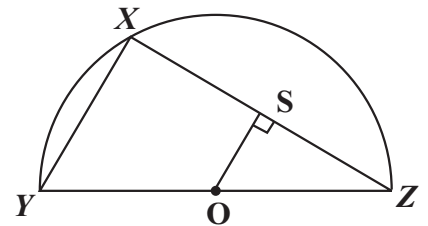
10. The side PS of the quadrilateral PQRS is produced up to T. Find the value of x .



11. Solve; $x(2x - 1) = 0$

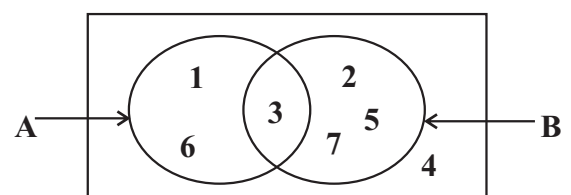
12. Find the LCM of $3x$, $4x^2y$, $x(x+1)$

13. XY and XZ are two chords of a semi-circle with the centre O. The perpendicular drawn from O to XZ is OS. Write two relationships of OS and XY.

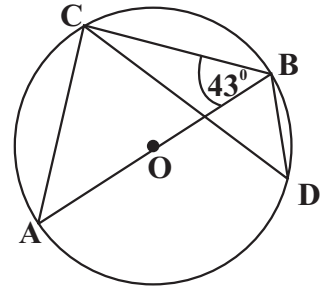


14. Write the set of positive integers which satisfies the inequality $2x + 1 < 6$.

15. According to the given Venn diagram, what is $n(A')$?

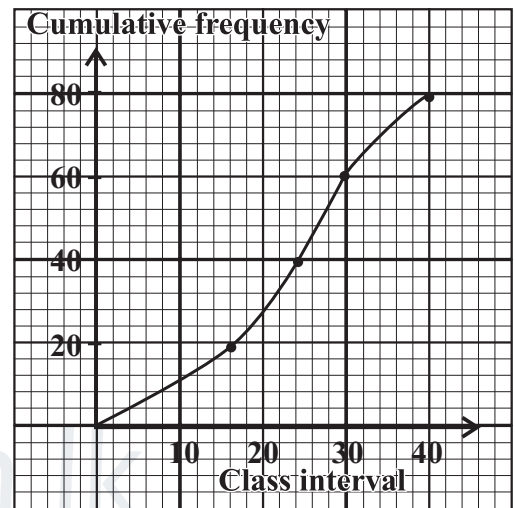


16. Of the given circle centre is O and $\hat{ABC} = 43^\circ$. Find the value of \hat{BDC} .



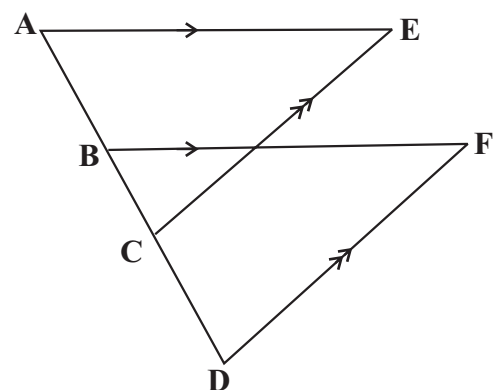
17. 32% of duty tax is charged for importing mobile phones which made in Singapore. According to that, find the value of a watch priced Rs. 8500 after paying the tax.

18. Find the interquartile range according to the cumulative frequency curve given below.

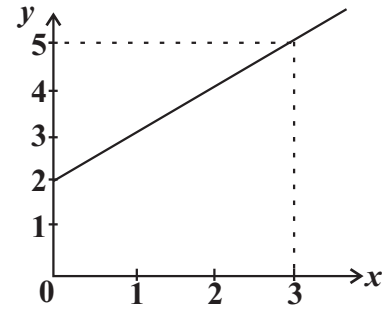


19. A car which travels at the speed of 60 kmh^{-1} spends 40 minutes to travel from the city A to city B. What is the time spend by a motor bicycle with the speed of 40 kmh^{-1} to travel from the city A to the city B.?

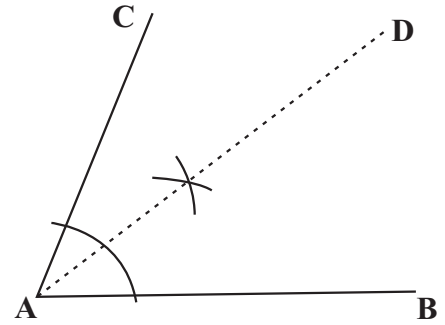
20. Of the given figure, $AE \parallel BF$, $CE \parallel DF$ and $AC = BD$.
Write the case of congruency of the triangles AEC and BFD.



21. Find the gradient of the straight line given in the coordinate plane.

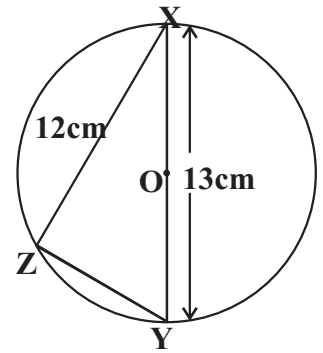


22. AD is the locus of points equidistant to AB and AC. Mark the way of obtaining the point P which locates on that locus and 6 cm away from AB on above sketch.

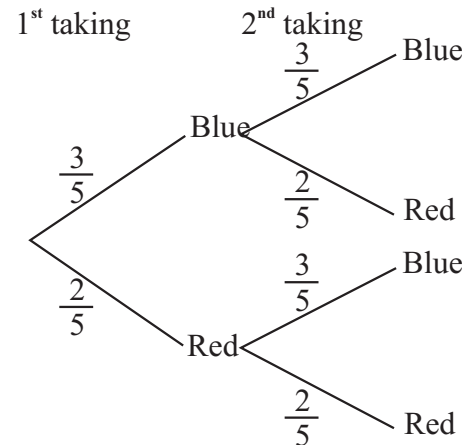


23. O is the centre of the circumscribed circle of the triangle XYZ. According to the figure,

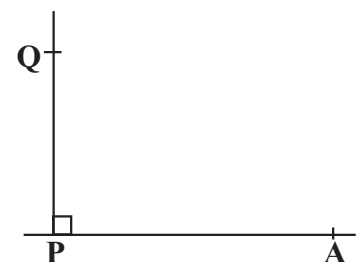
- (i) Find the value of \hat{XZY}
- (ii) Find the length of ZY



24. Thisara has a box contains 3 blue coloured LED bulbs and 2 red coloured LED bulbs. He takes out one bulb randomly and checks its colour, and he replaces it and randomly takes a bulb again. The tree diagram related to the all possible outcomes is given here. Find the probability of obtaining two LED bulbs with different colours.



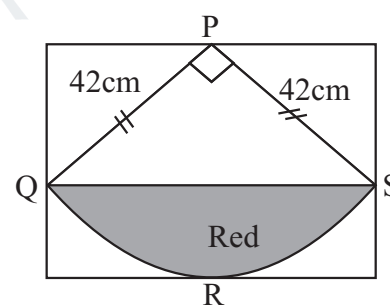
25. The location A is observed from the top of a tower Q with the height of 40 m which locates on the ground level at the 35° of angle of elevation. Mark these information on the given figure.



(01) $\frac{2}{7}$ of vehicles travels on an express way in one hour are busses $\frac{3}{4}$ of the remaining are cars and all other vehicles are Vans.

- (i) What fraction from total number of vehicles are cars and vans ?
- (ii) What fraction from total number of vehicles are cars ?
- (iii) If the number of cars travelled in above time period is 30. Find the total number of vehicles travelled in this hour.
- (iv) As the changes for the express way, If Rs. 600 is charged for busses, Rs. 400 is charged for Cars and Rs. 550 is charged for Vans. Calculate total income gained in this hour.

(02) Following creation is done by pasting red colored segment QRS and yellow colored sector PQRS on a white colored rectangular piece of cloth.



- (i) What is the fraction of sector PQRS from the whole circle ?
- (ii) Find the arc length QRS.
- (iii) Find the area of the sector PQRS.

(iv) Find the area of the red colored piece of cloth.

(v) 23 buttons are pasted along the edge of the sector PQRS of this creation. If the buttons are pasted along the sides PQ and RS with distance of 7 cm between two buttons. Find the distance between two buttons pasted along the edge of QRS.

(03) (a) Samarathunga and company released 40 000 shares each valued Rs. 12 to gain the capital. Mr. Pieris invested to buy 8 000 shares of this company.

(i) Find the basic capital of Samarathunga and company.

(ii) Write the ownership of Mr. Pieris of this company as a percentage.

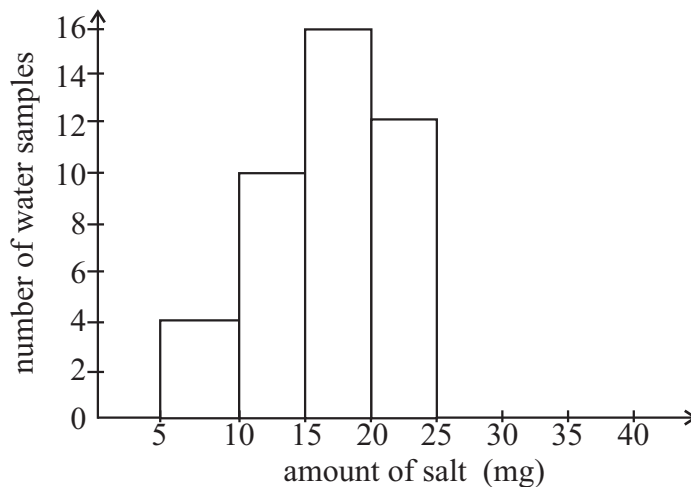
(iii) If Rs. 7 is paid as the dividend per share by the company. Calculate the dividend income gained by Mr. Pieris.

(b) Rs. 1680 of rate per a quarter is charged for a house of assessed value Rs. 84 000

(i) Find the annual rate charged.

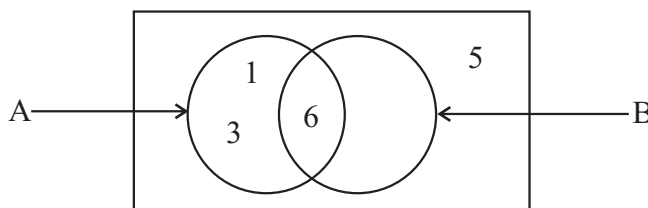
(ii) Find the percentage of rate charged.

04. Villagers of a certain region said that the salinity of water in the wells are high. According to that statement, it was tested 50 water samples collected from various places. An incomplete histogram drawn according to the results of amount of salt dissolved in the tested water samples is given below.



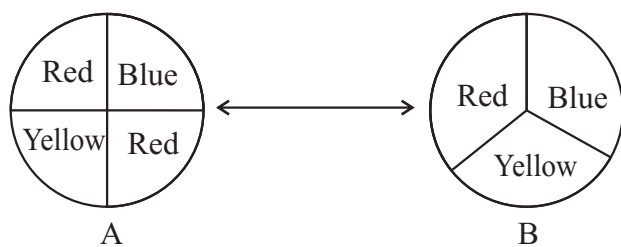
- (i) What is the number of water samples including the amount of salt 5-10 mg?
- (ii) What is the class interval of amount of salt having maximum number of water samples?
- (iii) Find the number of water samples of the class interval 25 - 35 mg and represent it on the given histogram.
- (iv) Draw the frequency polygon on the above histogram.

- (05) (a) $A = \{x : x \in \mathbb{Z}, 0 < x < 7\}$
 $B = \{\text{the digits of the number } 20264\}$



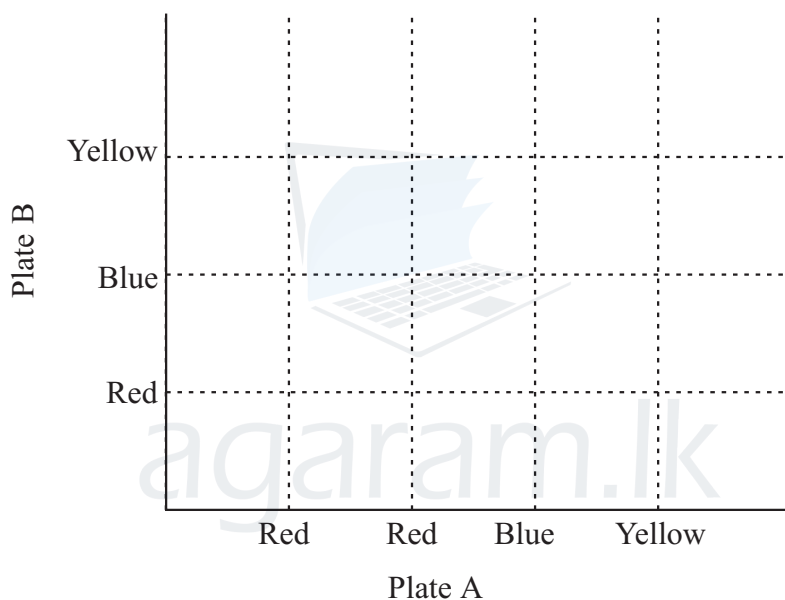
- (i) Complete the Venn diagram by including the elements of the set B.
- (ii) Write the set $A \cap B$ with the elements.
- (iii) What is $n(A \cap B)$?

(b) (i)



A and B are two rotatable plates. A student plays a game by making the colour stopped at the arrow head by rotating the plates simultaneously.

(i) Mark the sample space including all possible out comes obtained by him on the following grid.



(ii) Circle the outcomes of obtaining same colour in the above grid and write the probability of it.



PROVINCIAL DEPARTMENT OF EDUCATION - NORTH WESTERN PROVINCE

SECOND TERM TEST - 2018**Grade 11****MATHEMATICS - II****Three Hours**

Name / Index No. : *

- Answer 5 questions from Part A and 5 questions from Part B.
- Each questions carries 10 marks.
- The volume of a right circular cylinder, with base radius r and height h , is r^2h . Volume of a sphere with radius r is $\frac{4}{3} r^3$ Take $\frac{22}{7}$

Part - A

- (01) (a) An incomplete table of values prepared to draw the graph of the function, $y = (x - 2)^2 - 6$ is given below.

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

- (i) Find the value of y when $x = 2$.
- (ii) Draw the graph of the above function on the graph paper provided to you by taking 10 small divisions along both the x axis and the y axis to represent unit as scale.
- (b) By using the graph, answer the following questions.
- (i) Draw the axis of symmetry of the graph and write the equation of the axis of symmetry.
- (ii) Write the interval of values of x on which the function decreases from +2 to -5.
- (iii) Find the roots of quadratic equation $x^2 - 4x - 2 = 0$.

(02)

**Get brand new television with Rs. 7000
Cash payment for you old television.**

According to the advertisement published by a commercial institute, Mr. Sujeewa wanted to buy a television priced Rs. 67 000 giving his old television. Furthermore Sujeewa paid Rs. 15 000 as down payment and the remaining amount going to be paid in 15 equal monthly installments at 18% annual simple interest rate. The interest is calculated in the method of reducing balance. Find the value of a monthly installment.

- (03) (i) Express the equation $\frac{1}{x-2} + \frac{2}{x-3} = 1$ as the type of $ax^2 + bx + c = 0$
- (ii) By solving the above quadratic equation using any method, find the value of x to the second decimal place (Take $\sqrt{3} = 1.732$)

- (04) Priyantha and Samantha are two friends who left their school in the same day. Priyantha is a government servant with monthly salary Rs. 37 500 after completing his higher education. But Samantha works as there wheel driver.

The following table represent 20 days income of Samantha in a certain month.

Daily Income of Samantha	Number of days
1100 - 1200	01
1200 - 1300	03
1300 - 1400	04
1400 - 1500	07
1500 - 1600	04
1600 - 1700	01

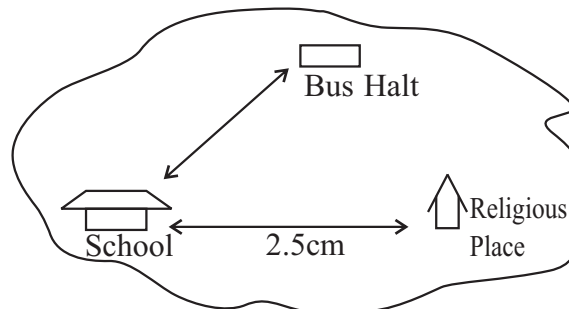
According to the table,

- (i) Calculate the mean of the daily income of Samantha.
- (ii) Using the mean, find the 30 days monthly income of Samantha.
- (iii) While getting the monthly income in part (ii) above Samantha spent 22 l petrol for Rs. 117 per liter and Rs. 6 500 maintenance charge. Accordingly show that Priyantha monthly income is more than to the Samantha's monthly income.

- (05) (a) Simplify, $\left(\frac{16}{81}\right)^{-\frac{3}{4}}$
- (b) In a question paper including 16 questions, there are some questions with 4 marks and the remaining questions are with 6 marks. The whole paper consists of 80 marks.
- (i) Taking the number of questions with 4 marks as a and the number of questions with 6 marks as b , construct pair of simultaneous equations.
- (ii) By solving the above pair of simultaneous equations, find the number of questions with 4 marks and the number of questions with 6 marks.

(06) (a) The diagram shows locations of three places in a certain city.

- (i) The distance between school and religious place is in the scale of 1:50 000. Using the scale, find the actual distance in Kilometers represented by 1 cm.



- (ii) Find the actual distance between school and religious place.

(b) When observing in the office of a certain factory (O), the generator (E) is located 110° bearing and with a distance of 60 m. Furthermore, the security office (S) is located 200° bearing and 80 m distance.

- (i) Draw a scale diagram using the scale of 1 : 1000
 (ii) Find the magnitude of $\hat{E}OS$
 (iii) Find the distance of ES.

Part B

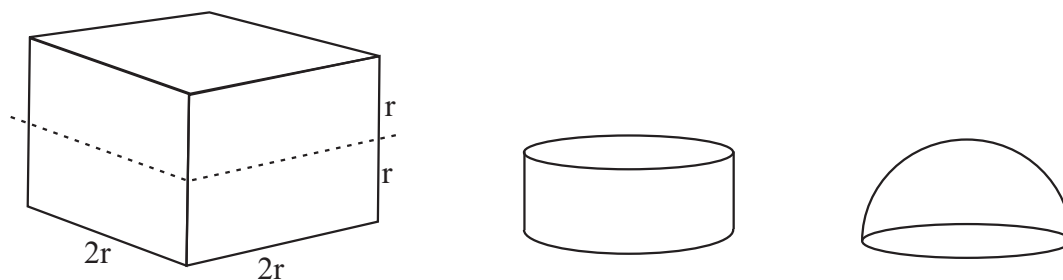
(07) (a) The mathematical teacher Ranjith advised to Raheem to arrange an arithmetic progression giving a set of cards with numbers. According to that, Raheem made the following arrangement.



- (i) Find the common difference of the arithmetic progression Raheem made.
 (ii) Using the formula, find the first term of the arithmetic progression.
 (iii) Find the sum of all the terms in the arithmetic progression.

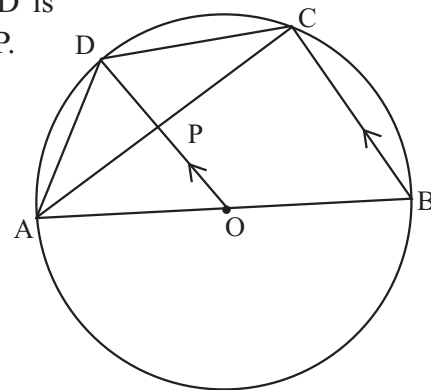
(b) Find the sum of first six terms of the geometric progression, 1, 3, 9,

(08)



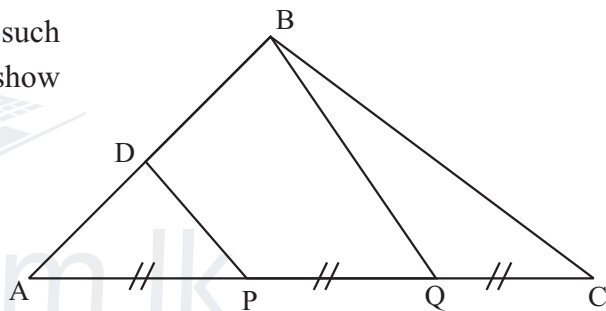
- (i) Dividing a wooden cube with side length $2r$ into two equal parts, taking a maximum diameter and maximum height, a cylinder and a hemi-sphere are made respectively. Show that the wasted wooden amount is $\frac{r^3}{3} (24 - 5\pi)$
- (ii) When, $\pi = 3.14$, $r = 0.2\text{m}$, show that the wasted wooden volume $V = \frac{(0.2)^3}{3} \times 8.3$, hence find the value of V using the logarithmic tables.

- (09) AB is the diameter of the circle with the centre O. The line OD is drawn parallel to BC. The straight lines AC and OD intersect at P.

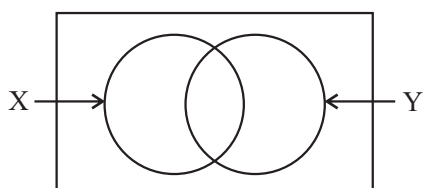


Prove that,

- (i) $\hat{A}PO = 90^\circ$
 - (ii) $\triangle APD \equiv \triangle PDC$ and $AD = DC$.
 - (iii) $\hat{B}AC = 90^\circ - 2\hat{A}CD$
 - (iv) $\triangle AOP$ and $\triangle ABC$ are equiangular triangles.
- (10) Do the constructions given below using a pair of compasses and a cm/mm scale with a straight edge. Show construction lines clearly.
- (i) Construct the angle $\hat{B}AD$ such that $AB = 8.0\text{cm}$, $AD = 6.0\text{cm}$ and $\hat{B}AD = 60^\circ$
 - (ii) Construct a line through D parallel to AB.
 - (iii) Construct straight line equidistance to A and D and name the point it meet AB as P and name the point it meets the line in part (ii) as Q.
 - (iv) Construct quadrilateral ADSP such that $AP = DS$ and placing S in the opposite side to Q
 - (v) Show that ADSP is a parallelogram and given reasons for the area of the $APQ = \frac{1}{2} ADSP$
- (11) In the triangle ABC, D is the mid point AB such that $AP = PD$. Using the given information, show that $\hat{D}CP = \hat{Q}BC$



- (12) The information gathered about the usage of internet by a group of 150 students of a certain secondary school is given in the below Venn diagram.

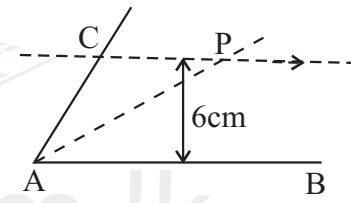
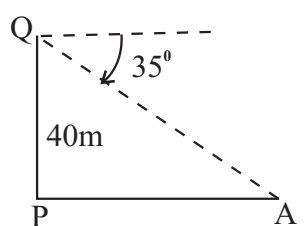


$X = \{\text{Grade 11 Students}\}$
 $Y = \{\text{Use Internet}\}$

- (i) Copy down above Venn diagram and shade the region of the Venn diagram which represents the set of students who use internet but they are studying in other grades.
- (ii) From the selected group of students, 90 students are in grade 11 and 35 students use internet. Also 50 students studying in other grades do not use the internet. Represent this information in the Venn diagram.
- (iii) By using the Venn diagram, find the number of grade 11 students who use the internet.
- (iv) If one student is select randomly from this group for a competition of presenting a power point presentation, Write the probability of selecting a student who belongs to $(X' \cap Y)$
- (v) If all students who use the internet are grade 11 students, redraw the Venn diagram to represent these information.

Paper I - Part A

(01)	22cm $\frac{88}{4}$	①	②
(02)	$\log_{10} 0.01 = -2$		②
(03)	4		②
(04)	$\frac{11}{12a}$ $\frac{20 - 9}{12a}$ or $12a$	①	②
(05)	40^0 70^0	①	②
(06)	$(x - 5)(x + 4)$ $x^2 - 5x + 4x - 20$	①	②
(07)	(i) $AD \parallel BC$ (ii) $\hat{ADC} = \hat{ABC}$	① ①	②
(08)	06 days $\frac{15 \times 10}{25}$	①	②
(09)	10 cm $\frac{125}{12.5}$	①	②
(10)	$x = 20^0$		②
(11)	$x = 0, x = \frac{1}{2}$		②
(12)	$12x^2y(x + 1)$		②
(13)	(i) $OS = \frac{1}{2} XY$ or $XY = 2OS$ (ii) $OS \parallel XY$	① ①	②
(14)	$\{1, 2\}$ $x < 2.5$	①	②
(15)	$n(A') = 4$		②

(16)	$\hat{BDC} = 47^0$ $\hat{BAC} = 90 - 43$	①	②
(17)	Rs. 11220 $8500 \times \frac{132}{100}$	①	②
(18)	30 - 16 14	① ①	②
(19)	01 hour Distance travelled in 40 minutes = 40 km	① ①	②
(20)	A. A. S.		②
(21)	Gradient = 1 $m = \frac{5 - 2}{3 - 0}$	① ①	②
(22)	 To represent parallelism of line, To mark 6 cm	① ①	②
(23)	90^0 5cm	① ①	②
(24)	$\frac{12}{25}$ $\frac{6}{25} + \frac{6}{25}$	① ①	②
(25)	 Marking 35^0 or 40m		②

Grade 11

MATHEMATICS - Marking Scheme - Continuation

Part II																																			
(01)	(a) (i) -6 ① (ii) Correct Axes ① Marking points ① Smooth curve ①-④																																		
	(b) (i) $x = 2$ ① (ii) $-0.8 < x < +1$ ② (iii) $y = 0$ ① $x = 4.4$ or $x = -0.4$ ②-⑥																																		
			10																																
(02)	Loan amount = $67000 - (7000 + 15000)$ ① = 45000 Monthly loan amount = $\frac{45000}{15}$ ① = 3000 ① Interest for one month unit = $\frac{18}{100} \times 3000 \times \frac{1}{12}$ ① = 45 ① No. of month units = $\frac{15}{2} \times 16$ ① = 120 ① Total Interest = 45×120 ① = 5400 ① Total amount paid $\begin{array}{r} 45000 \\ 5400 \\ \hline 50400 \\ \hline 15 \\ \hline \end{array}$ ① = Rs. 3360 ①																																		
			10																																
(03)	(i) $\frac{1}{a-2} + \frac{2}{a-3} = 1$ $\frac{a-3 + 2a-4}{(a-2)(a-3)} = 1$ ② $a^2 - 5a + 6 = 3a - 7$ $a^2 - 8a + 13 = 0$ ①-③ (ii) $a^2 - 8a = -13$																																		
(04)	(i)	<table border="1"> <thead> <tr> <th>Class Interval</th> <th>Mid value</th> <th>f</th> <th>fd</th> </tr> </thead> <tbody> <tr> <td>1100 - 1200</td> <td>1150</td> <td>1</td> <td>1150</td> </tr> <tr> <td>1200 - 1300</td> <td>1250</td> <td>3</td> <td>3750</td> </tr> <tr> <td>1300 - 1400</td> <td>1350</td> <td>4</td> <td>5400</td> </tr> <tr> <td>1400 - 1500</td> <td>1450</td> <td>7</td> <td>10150</td> </tr> <tr> <td>1500 - 1600</td> <td>1550</td> <td>4</td> <td>6200</td> </tr> <tr> <td>1600 - 1700</td> <td>1650</td> <td>1</td> <td>1650</td> </tr> <tr> <td></td> <td></td> <td>20</td> <td>28300</td> </tr> </tbody> </table> Mean daily income = $\frac{fx}{f}$ = $\frac{28300}{20}$ ① = 1415 ① mid values ① fx column ① fx ①-⑤	Class Interval	Mid value	f	fd	1100 - 1200	1150	1	1150	1200 - 1300	1250	3	3750	1300 - 1400	1350	4	5400	1400 - 1500	1450	7	10150	1500 - 1600	1550	4	6200	1600 - 1700	1650	1	1650			20	28300	$a^2 - 8a + 16 = -13 + 16$ ① $(a - 4)^2 = 3$ ① $a - 4 = \pm \sqrt{3}$ ① $a - 4 = 1.732$ or $a - 4 = -1.732$ ① $a = 1.732 + 4$ $a = 1.732 + 4$ ① $a = 5.732$ $a = 2.268$ $a = 5.73$ $a = 2.27$ ②-⑦
Class Interval	Mid value	f	fd																																
1100 - 1200	1150	1	1150																																
1200 - 1300	1250	3	3750																																
1300 - 1400	1350	4	5400																																
1400 - 1500	1450	7	10150																																
1500 - 1600	1550	4	6200																																
1600 - 1700	1650	1	1650																																
		20	28300																																
			10																																
(05)	(a) $\left(\frac{16}{81}\right)^{-\frac{3}{4}}$ $\frac{1}{\left(\frac{16}{81}\right)^{\frac{3}{4}}}$ ① $\frac{1}{\left(\frac{2^4}{3^4}\right)^{\frac{3}{4}}}$ ①																																		
			10																																

Agaram.LK - Keep your dreams alive!

Agaram.LK - Keep your dreams alive!

Grade 11

MATHEMATICS - Marking Scheme - Continuation

$= 8r^3 - \frac{5r^3}{3}$	①	
$= \frac{24r^3 - 5r^3}{3}$	①	
$= \frac{r^3}{3} (24 - 5)$	④	
(ii) $V = \frac{(0.2)^3 \times 8.3}{3}$		
$V = (3 \log 0.2 + \log 8.3) - \log 3$	①	
$V = (3 \times 1.3010 + 0.9191) - 0.4771$	③	
$= (3.9030 + 0.9191) - 0.4771$		
$= 2.8221 - 0.4771$		
$= 2.3450$	①	
$= \text{only } 2.3450$		
$= 0.02213$	①	⑥
		10

(09) (i) $\hat{TTPACB} = 90^\circ$	①	
Proof $\hat{ACD} = \hat{APO}$	①	②
$\hat{APO} = 90^\circ$		
(ii) $AOP \Delta$ and $DPC \Delta$ s		
DP = DP (perpendicular bisect the chord)		
$\hat{APD} = \hat{DPC} (90^\circ)$		
AP = PC (common side)		
$\therefore APD\Delta \equiv DPC\Delta$ (S. A. S.)	③	
$\therefore AD = DC$ (remaining corresponding properties)	①	
(iii) $\hat{AOP} = 2\hat{ACD}$ (angles on same segment)	①	
$\hat{APO} = 90^\circ$ (Axioms)		
$\therefore \hat{BAC} = 90 - 2\hat{ACD}$	①	
(iv) $ABC\Delta$ or $AOP\Delta$		
$\hat{ACB} = \hat{APO}$ (Angles an Δ)		
$\hat{ABC} = \hat{AOP}$ (Same segment Δ)		
$\hat{BAC} = \hat{OAP}$ (Opposite angles Δ)	②	
$\therefore ABC\Delta$ or $AOP\Delta$		
(are equiangular triangles)		
		10

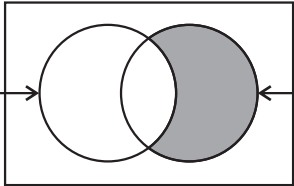
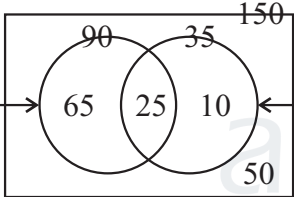
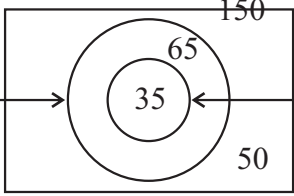
(10)		
(i) AB or AD	.....	①
60°	①-②
(ii) To construct parallel line	.....	①
(iii) To construct perpendicular bisector of AD	.....	①
For marking P and Q	.....	①-②
(iv) To mark S	.....	①
To complete quadrilateral APSD	.....	①-②
(v) AP // DS		
AP = DS		
APSD is a parallelogram	.....	②
APQ = 1/2 APSD (lie on common base and in between same pair of parallel lines)	.....	①
		10

(11)		
$\hat{DCP} = \hat{QBC}$		
P is mid point of AQ } (Data)	.....	①
D is mid point of AB } (Data)	.....	①
BQ = 2DP (M.P.T.)	.....	①
AP = PQ = QC (Data)		
PC = 2AP	.....	①
PD = AP (Data)	.....	①
PC = 2PD	.....	②
① = ②		
BQ = PC (Data)	.....	①

Grade 11

MATHEMATICS - Marking Scheme - Continuation

<p>AP = PD (Data)</p> <p>AP = QC</p> <p>PD = QC ①</p> <p>BQC and DPC</p> <p>BQ = PC (proved)</p> <p>QC = DP (proved)</p> <p>BQC = PDC (S.A.S.)</p> <p>$\hat{BQC} = \hat{DPQ}$ (DP//BQ) ②</p> <p>$\hat{DCP} = \hat{BQC}$ (remaining ①</p> <p>corresponding properties) ①</p>	<p>10</p>
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<p>(12) (i) </p> <p>for shading region ①</p>	<p>10</p>
<p>(ii) </p> <p>To mark 65, 10, 25 correctly ③</p>	<p>③</p>
<p>(iii) 25 ②</p>	<p>②</p>
<p>(iv) $\frac{10}{150}$ or $\frac{1}{15}$ ②</p>	<p>②</p>
<p>(v) </p> <p>For correct Venn diagram ①</p> <p>To mark 35 ①</p>	<p>①</p> <p>①</p>
	<p>10</p>



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