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சபரகமுவ மாகாண கல்வித் திணைக்களம்
Sabaragamuwa Provincial Department of Education

දෙවන වාර පරීක්ෂණය 2018
இரண்டாம் தவணைப் பரீட்சை 2018
Second Term Test 2018

11 ශ්‍රේණිය
தரம் 11
Grade 11

ගණිතය **I**
கணிதம் **I**
Mathematics I

පැය දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Name / Index No.. Class:

★ Answer all questions on this paper itself.

Part - A

01) Consider the following statements about $\sqrt{20}$ mark (\checkmark) or (\times)

$4 < \sqrt{20} < 5$	
$4.4^2 = 19.36$	
$4.5^2 = 20.25$	
1 st approximation of $\sqrt{20} = 4.4$	

02) Simplify : $24a^2b \div 8ab^2$

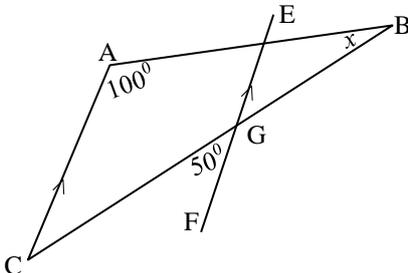
03) $p \in \mathbb{Z}^+$, $(x+p)^2 = x^2 + ax + 16$ Find the

i. value of p

ii. value of a

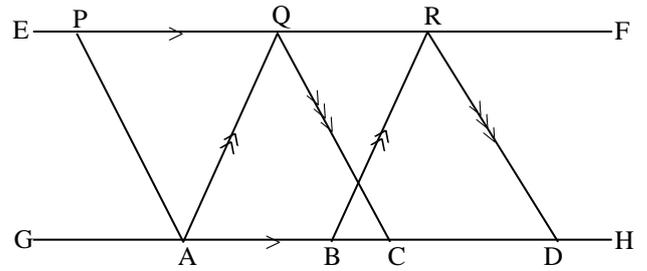
04) Solve : $\frac{4}{x+2} = \frac{2}{x}$

05)

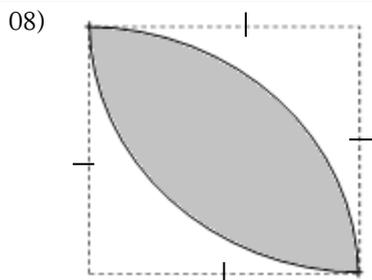


If $\hat{BAC} = 100^\circ$, AC parallel EF , and $\hat{CGF} = 50^\circ$ find the value of x

- 06) In the figure EF and GH , AQ and BR , QC and RD parallel each other. If the area of parallelogram $QRDC$ is equal 24cm^2 and $PQ = QR$, find the area of $PQA\Delta$

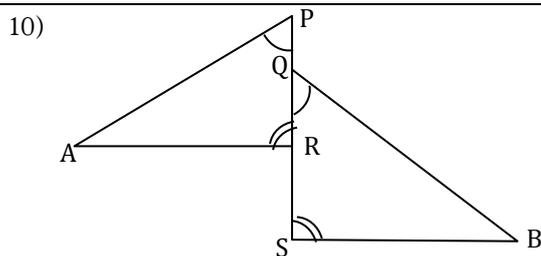
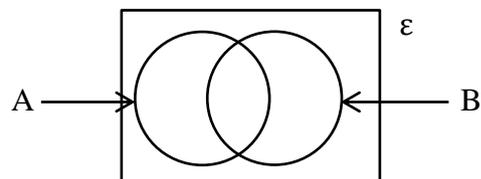


- 07) If $\lg x = n$
- Write in index form.
 - Find the value of x , when $n = 2$

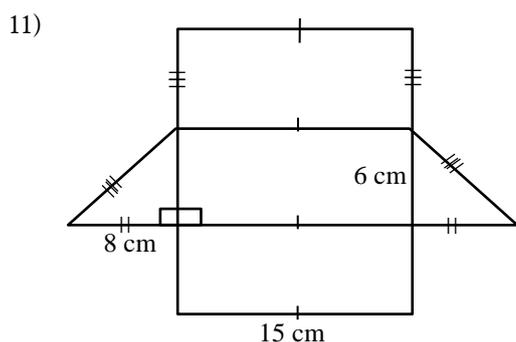


Consider the card board block cut from a square sheet with 7cm length as appear on the figure. What is the perimeter of the figure?

- 09) If $n(A) = 15$ and $n(B) = 20$ and $n(A \cap B) = 8$ find the value of $n(A \cup B)$



In the triangle APR and BSQ , if $\hat{A}PR = \hat{B}QR$ and $\hat{A}PR = \hat{B}SC$, $PQ = RS$ what is the congruent state?

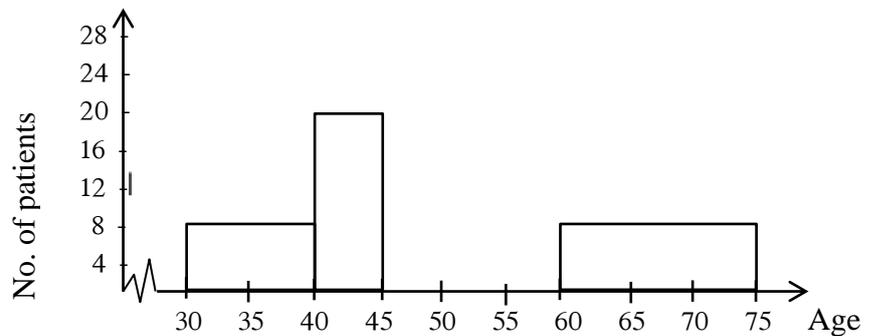


Consider the given block of an object,

- Give a specific name of the object?
- Find the volume of the object if the cross section area is 24cm^2

12) Consider the following data of patients in a clinic of rural hospital. Complete the histogram.

Age of patients years	No. of patients
30 - 40	16
40 - 45	20
45 - 50	28
50 - 60	24
60 - 75	24



13) If a father gave $\frac{1}{2}$ of his land to son and $\frac{1}{5}$ to his daughter, what is the fraction remains with him?

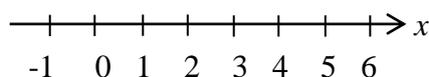
14) Factorize : $y^2 - 3y - 10$

15) Wimal invests Rs 60000 in a business when the market price is at 30.00, if the annual dividend profit is at Rs. 2.25 per share, what is his annual income?

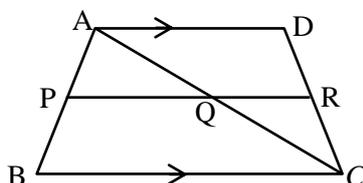
16) 600 l capacity tank fills water with a pipe 40 l per minute. How long will it take to fill the tank completely?

17) Probability of germination a of bitter guard seed is $\frac{90}{100}$. Probability of germination a Beet Root seed is $\frac{80}{100}$, Find the probability of germinating both bitter guard and Beet Root seeds.

18) Represents the value of x of the inequality $2x < \frac{3x+5}{2}$ on the given number line.

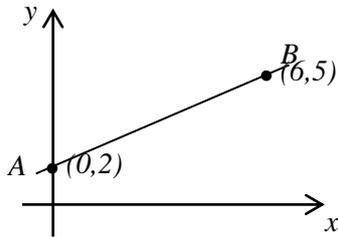


19)



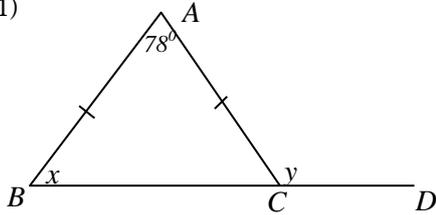
In the figure, $AD \parallel BC$, P and Q are the two mid points of AB and AC, CR = 6cm. Find the length of CD

20)



- i. What is the gradient of the line AB
- ii. Write the equation of the line AB

21)

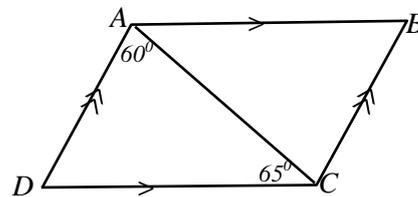


In the triangle ABC , $AB = AC$, BC produced to D , if $\hat{BAC} = 78^\circ$, find the

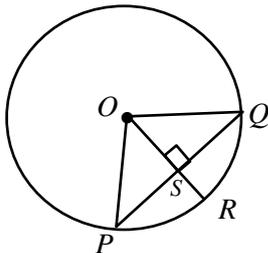
- i. value of x
- ii. value of y

22)

Based on the information given in the parallelogram $ABCD$ find The magnitude of \hat{ABC}

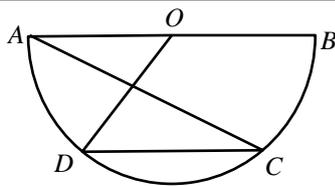


23)



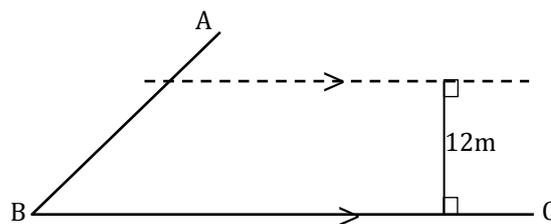
The Centre of the circle is O . If radius is 13cm , $PQ = 24\text{cm}$, and $OS = 5\text{cm}$, find the length of PS

24)



The Centre of the given circle is O , AB is a diameter of the given semicircle. C and D are two points on the circle if $\hat{ACD} = 36^\circ$, find the value of \hat{BOD} ?

- 25) The light post L is to be fixed at a point at the equal distance with to AB and BC and 12m from the road BC . Mark the location of L of the given diagram by using the knowledge if loci.

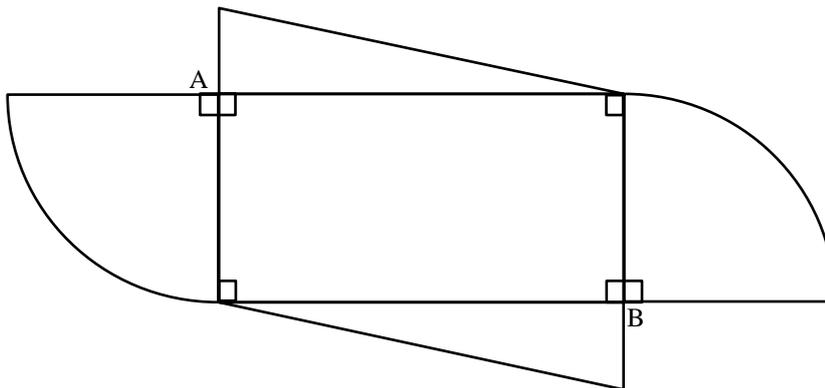


Part - B

(Answer all the questions on this paper itself.)

- (01) A vendor bought a stock of mangoes for Rs. 12 each per fruit. He kept aside $\frac{1}{15}$ of the stock and separated the rest for the sale. Out of the number of mangoes separated for sale, $\frac{1}{16}$ were spoilt and he received Rs. 1400 by selling the remaining mangoes at Rs. 20 each per fruit.
- i) Find the number of mangoes separated for sale as a fraction of the whole stock.
 - iii) Find the number of mangoes sold as a fraction of the whole stock.
 - iii) What is the number of mangoes sold?
 - iv) Find how many mangoes the vendor bought.
 - v) Find the profit he gained.

(02)

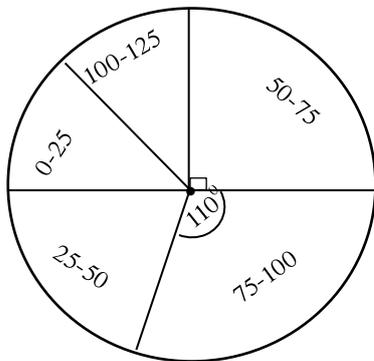


The figure shows a brass sheet used to make a memorial plaque. It consists of two sectors of radius 7cm, a rectangle of length 12 cm and breadth 7cm and two right angled triangles of the length of the hypotenuse 13 cm and the lengths of the two sides containing the right angle 12cm and 5 cm.

- i) Find the length the arc of a sector
- ii) Find the perimeter of the sheet.
- iii) Find the area of a sector.
- iv) Calculate the area of the sheet.
- v) Find the area of the rectangular brass sheet required to cut out the plaque sheet.

- (03) a) A vehicle dealer imports a motor bike worth Rs. 120 000/-
- If customs duty of 60% is charged when importing the bike, find the amount of customs duty he has to pay.
 - If an additional amount of Rs. 12000 is charged for unloading the bike at the harbour and transportation, find the total amount spent on the bike.
 - If Rs. 30600 has to be paid as VAT on the total amount he spent for the bike, calculate the percentage VAT charged.
- b) It has been estimated that it takes 4 men 6 days to construct a stone retaining wall in a land. After all 4 men work for 4 days, how many more men should be employed to complete the remaining amount of the task in one day?

(04)



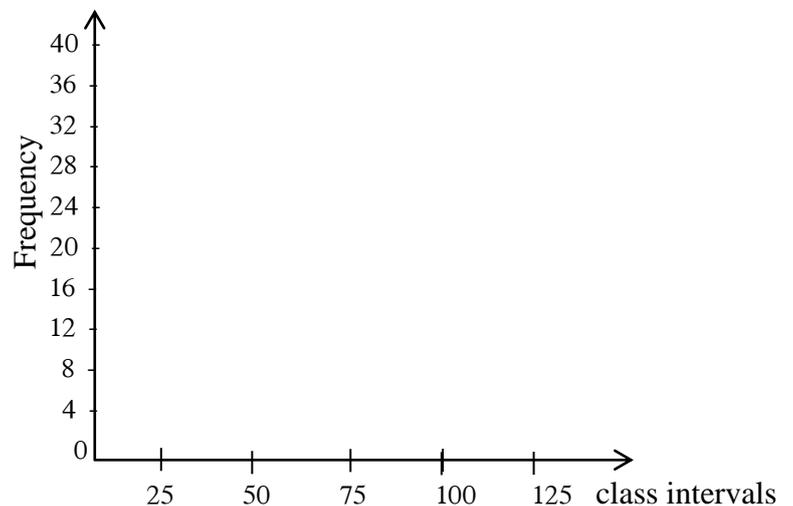
The pie chart given here shows the number of units of electricity used by a group of households in a certain housing scheme.

- ★ The number of households that used 0-25 units is equal to the number of house holds that used 100-125 units
- ★ The number of households that used 25 - 50 units is twice the number of households that used 0-25 units.

- What is the angle at the centre of the sector that represents the number of house-holds that used 0-25 units.
- If the number of house-holds that used 0-25 is 12, fill in the blanks in the table given below.

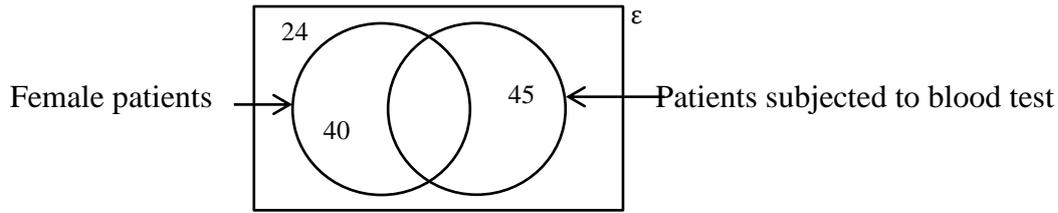
No. of units	No. of house-holds
0 - 25	12
25 - 50	24
50 - 75	_____
75 - 100	_____
100 - 125	12

- Using the data in the table, draw the relevant histogram on the axes shown below.



- Draw the frequency polygon using the histogram.

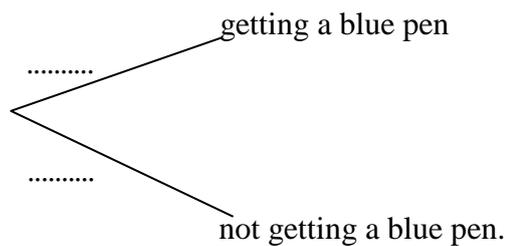
05) a) The Venn diagram given below shows information collected regarding 150 patients who attended a medical clinic on a certain day.



- i) Shade the region, in the above Venn diagram, that represents the female patients who were subjected to the blood test.
- ii) Find the number of male patients who attended the clinic.
- iii) Find the number of female patients who were subjected to the blood test.

b) A box contains 3 blue pens and 7 pens of different colours. All pens are of the same size and same shape. One pen is taken randomly out of the box.

- i) What is the probability of getting a blue pen?
- ii) An incomplete tree diagram that illustrates the events relevant to above random experiment is shown below. Complete the tree diagram by writing the relevant probabilities on the branches.



- iii) There is another box containing two blue pens and 3 red pens of the same shape and same size. From this box, one pen is taken randomly. Extend the above tree diagram to include this information and find the probability of getting two blue pens in both instances.

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11 ශ්‍රේණිය
தரம் 11
Grade 11

ගණිතය II
கணிதம் II
Mathematics II

පැය 3.00
இரண்டு 3.00
3.00 hrs

- ★ Answer **ten** questions selecting **five** questions from Part A and **five** questions from part B.
- ★ Each question carries 10 marks.
- ★ The volume of cylinder of radius r and height h is $\pi r^2 h$ and the volume of a right circular cone of radius r and height h is $\frac{1}{3} \pi r^2 h$

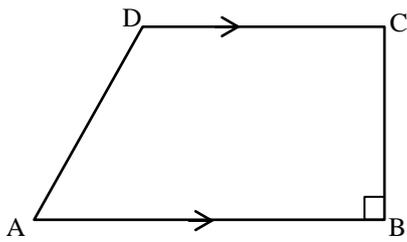
Part - A

- (01) Mr.Jayanath who received a compensation as he lost his land due to the construction of a certain highway, deposited the compensation in a bank that paid an annual simple interest rate of 11% and received Rs. 132,000/- as interest at the end of two years. At the beginning of the third year, he withdrew the amount he had deposited and deposited that amount of money for 2 years in another commercial bank that paid an annual compound interest rate of 11%. Show that he gained a profit of Rs. 7260 by depositing the money in the second commercial bank.
- (02) An incomplete table of values of x and y prepared to draw the graph of the function $y = (x + 2)^2 - 3$ is given below.

x	-5	-4	-3	-2	-1	0	1
y	6	1	-2	-2	1	6

- a) i) Find the value of y when $x = -2$
ii) 10 small divisions along both x and y axes as one unit, draw the graph of the above function.
- b) Using the graph,
i) Write down the equation of the axis of symmetry.
ii) Write down the minimum value of the function.
iii) Write down the interval of values of x when $y \leq -1$
iv) Find the value of $\sqrt{3}$

03)



In trapezium $ABCD$ shown in the figure, $AB = (x + 4)$ cm and $BC = x$ cm, $BC = CD$ and the area of the trapezium is 44cm^2 . Build up an quadratic equation in terms of x and find the value of x to the first decimal place by solving the equation.

04) a) Solve : $\frac{2x}{(x+1)} = \frac{x}{2(x+1)} + \frac{1}{3}$

b) The price of two apples and an orange is Rs. 55. Four oranges can be bought with the money spent to buy three apples.

- i) Taking the price of an apple as Rs. x and the price of an orange as Rs. y , construct a pair of simultaneous equations including x and y .
- ii) Solve the above equations and find the price of an apple and an orange separately.
- iii) When the number of apples is a and the number of oranges is b , write down a pair of values for a and b that satisfy the equation $ax + by = 200$

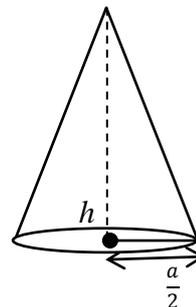
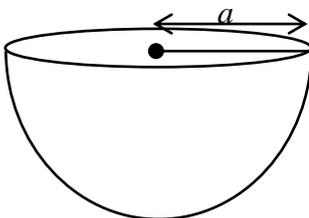
05) Information on the distances that a rent car travelled during 50 days is shown in the table given below.

Distance (km)	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of days	3	5	6	15	9	8	4

(the class interval 20-30 indicates the number of days greater than 20 and less than or equal to 30)

- i) What is the number of days that the rent car has travelled more than 50 km?
- ii) Taking the mid value of the modal class as the assumed mean, calculate, to the nearest kilometre, the mean distance the rent car has travelled in a day.
- iii) If the owner of the rent car charges Rs. 40 per kilometre and the total amount he has to spend for fuel and maintenance is Rs. 12 per kilometre, show that the mean income he gains for a day is more than Rs. 15000.

06) a)

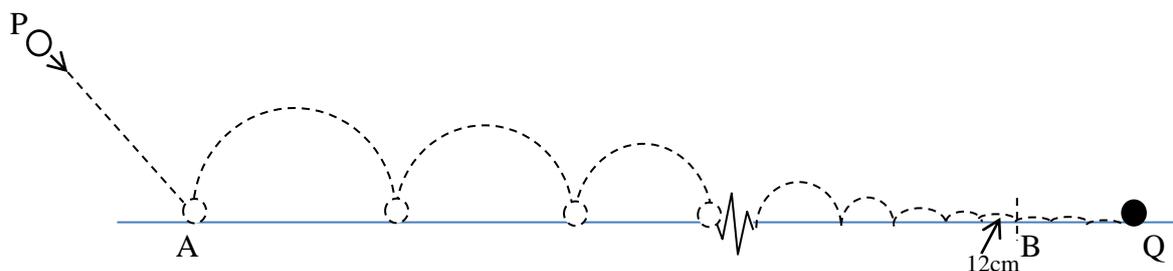


A right circular solid metal cone of height h and base radius $a/2$ has been made by melting a hemispherical metal object of radius a without any wastage of metal.

- i) Find the volume of the hemisphere metal object in terms of a
 - ii) Show that the height of the metal cone is, $h = 8a$
- b) Using logarithmic tables, simplify $\frac{\sqrt{12.47}}{3.45^2} \times 100.5$

Part - B

07) a)



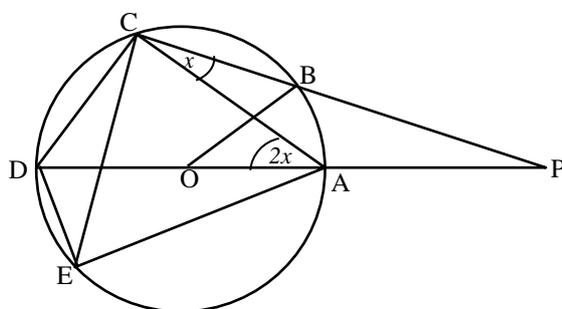
When a tennis ball is projected from the point P inclined to the vertical as shown in the figure, the ball moves in the first three consecutive bounces are 72cm, 69cm, 66cm respectively. The distance the ball moves from B to Q is 25 cm. The distance between the point B and the point it touches the ground prior to B is 12 cm. Using your knowledge about progressions, show, giving reasons, that the distance AQ is 9.07 m.

b) Find the sum of the first 11 terms of the geometric progression 3, -6, 12, -24
(take $(-2)^{11} = -2048$)

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

- i) Construct the triangle ABC such that $AB = 7\text{cm}$, $\hat{BAC} = 60^\circ$ and $AC = 5.5\text{cm}$
- ii) Construct a straight line through C parallel to AB
- iii) Construct a perpendicular to the parallel line constructed in (ii) above from B and name its foot as D .
- iv) Construct the perpendicular bisector of AB and BD and name the point of intersection of the perpendicular bisectors as P
- v) Taking the centre as P , construct the circle that passes through the points A , B and D . Suggest a suitable name for AD using the circle.

09)

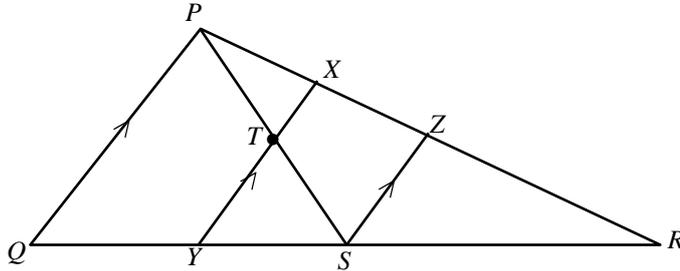


The points A , B , C , D and E lie on the circle with centre O . AOD is a diameter CB and DA produced to meet at P . If $\hat{ACB} = x$ and $\hat{DAC} = 2x$ write down the magnitude of each of the following angles in terms of x .

- ii) \hat{CED}
- iii) \hat{ADC}
- iv) \hat{AOB}
- v) \hat{APC}

- 10) The point P is located in the parallelogram $ABCD$. The mid point of CP is X . The straight line BX is produced to Q such that $BX = XQ$. AQ intersects DP at Y . Draw a figure and include the above data and show that Y is the mid point of DP .

11)



The midpoint of side QR of triangle PQR is S and the midpoint of PS is T . The straight line drawn through T parallel to PQ intersects PR and QR at X and Y respectively. The straight line drawn through S parallel to XY intersects PR at Z .

- i) Find the length of TY in terms of PQ
 - ii) Find the length of XT in terms of PQ
 - iii) Find the length of XY in terms of PQ
 - iv) Show that $YS = \frac{1}{4} QR$
- 12) An unbiased cubical die numbered from 1 to 6 and an unbiased tetrahedron die numbered from 1 to 4 are thrown together, and the two numbers that turn up are observed.
- i) Show the sample space of this random experiment in a grid.
 - ii) Enclose the event of obtaining the same number in both cubical die and tetrahedron die in the grid and name it as A . Find the probability of event A .
 - iii) Enclose the event of the sum of the two numbers obtained from the two dice being greater than 7 and name it as B . Find $p(B)$
 - iv) Write down $P(A \cup B)$ and $P(A \cap B)$ and verify $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 - v) If L and M are two mutually exclusive events of a certain sample space, find the value of $P(L \cap M)$
