

Provincial Department of Education, Eastern Province

General Certificate of Education (Ordinary Level) Student Evaluation 2020

Mathematics

32

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I

Two Hours

Part - A

1. A municipal council charges 7% of the assessed annual value of a house. If Rs.1 400 has to be paid as quarterly rates, calculate the assessed annual value of the house.

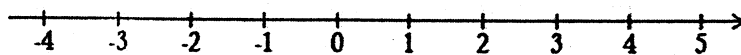
2. X and Y are two independent events. If  $P(X) = \frac{1}{3}$  and  $P(X \cap Y) = \frac{1}{12}$ , find  $P(Y)$ .

3. Calculate the average speed of a vehicle which travels 200 Km in  $2\frac{1}{2}$  hours with uniform speed.

4. If  $\lg 2 = x$ ,  $\lg 3 = y$ , find  $\lg 12$  in terms of  $x, y$ .

5. Solve :  $(x - 3)(x + 5) = 0$

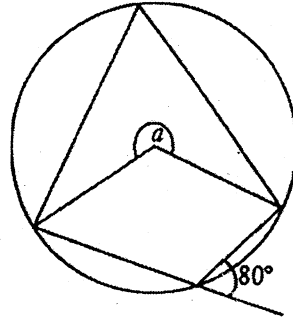
6. Solve the inequality  $3 - x \geq 4$  and represent the integral solutions on the number line given below.



7. Simplify :

$$\frac{1}{2x} + \frac{1}{8x}$$

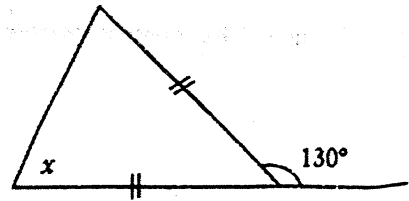
8. Based on the information, find the magnitude of  $a$ .



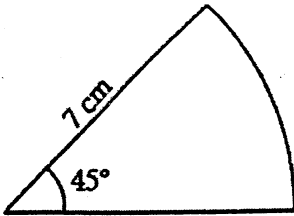
9. It took 12 men 6 days to complete a certain task. How many more men required to complete the same task in 4 days?

10. If  $A = \{x / x : \text{Prime number } 10 < x < 20\}$ , find  $n(A)$ .

11. Find the value of  $x$  according to the information given in the figure.

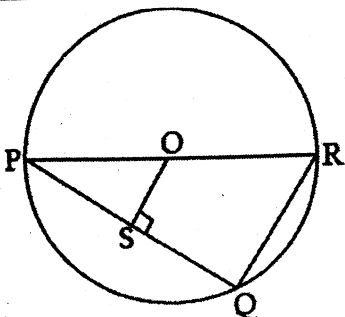


12. Find the arc length of the given sector.

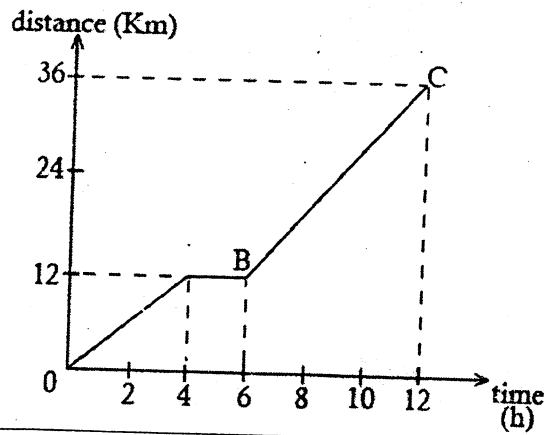


13. Find the L.C.M of  $3(a + 2), 12(a - 2), a^2 - 4$ .

14. The diameter of the circle with the center  $O$  is 20 cm. If  $QR = 16$  cm, find the length of  $PS$ .

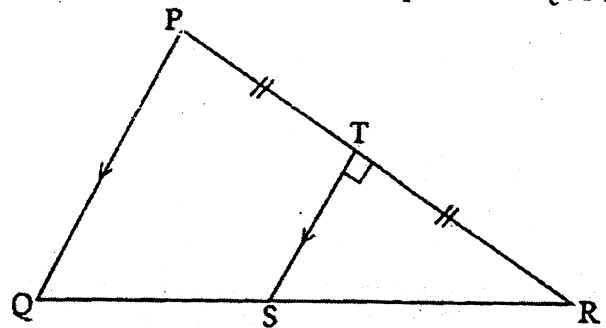


21. A distance time graph of the motion of a vehicle the speed at which it travelled from B to C.



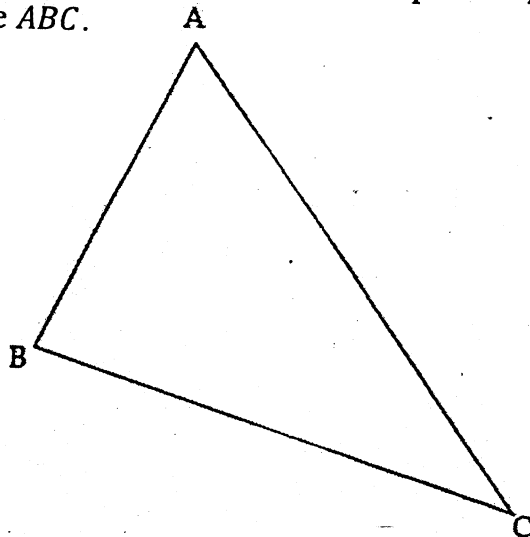
22. The mean weight of 5 students is 40 Kg. When a student joins these students, the mean weight of all 6 students is 42 Kg. Find the weight of the newly joined student.

23. In the given figure,  $PQ = 6\text{ cm}$  and  $SR = 5\text{ cm}$ . Find the perimeter of the trapezium  $PQST$ .



24. Factorize :  $2a^2 - 50$

25. Mark the point  $O$  which is equidistance from the points  $A, B$  and equidistance from the lines  $AB, BC$  in the triangle  $ABC$ .



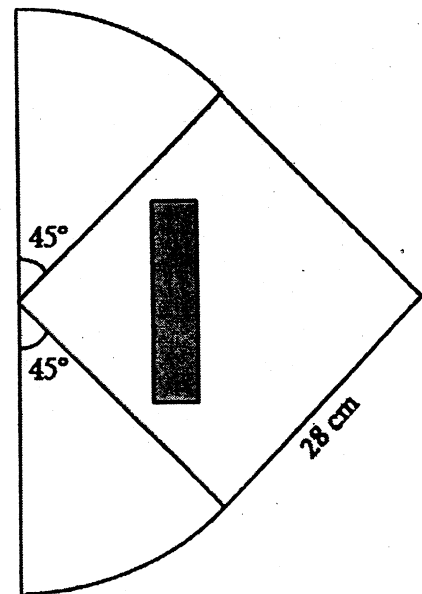
Part - B

1. A farmer cultivated paddy in  $\frac{3}{8}$  of his land, coconut trees in  $\frac{2}{5}$  of his land. He then cultivated vegetables of the remaining portion.

- (i). What fraction of the whole land the coconut trees had been cultivated.
- (ii). Give the fraction of the vegetable cultivated land out of the total land.
- (iii). If the vegetables had been cultivated in  $150 \text{ m}^2$ , find the total amount of land.
- (iv). If  $15 \text{ Kg}$  of vegetables are expected to be available in  $1 \text{ m}^2$  area, find the yield of whole vegetables expected to be available to him.

2. The given figure is a frame which consists of two sectors and a square.

- (i). Find the radius of the sector.
- (ii). Find the perimeter of the frame.
- (iii). Find the area covered by the frame.



- (iv). If the cost of  $1 \text{ m}$  wire is Rs.225, find the amount of money needed to construct the frame.

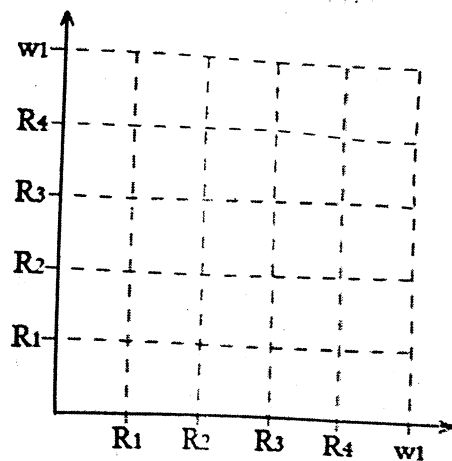
3. Kamal bought shares in a company at the market price of Rs.26 per share. After receiving dividends for a year, he sold all his 300 shares when the market price per share was Rs.30.

- (i). Find the amount he invested in shares.
- (ii). Find the amount that he received by selling the shares.
- (iii). If the company pays annual dividends of Rs.4 per share, find the annual dividends that he received through this investment.
- (iv). Write the income he receives through the investment as a percentage of the investment amount.

(b) If t  
ref  
(i).

4. (a) There are 4 Red and 1 White identical balls in a box. A person takes a ball randomly from the box. With replacing the ball he takes another ball from the box.

- (i). Using the symbol "x", represent the sample space of the above experiment in the grid.  $R_1, R_2, R_3, R_4$  represent Red balls and  $W_1$  represents White ball.



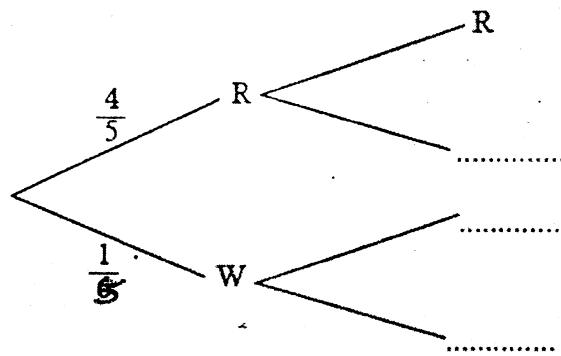
- (ii). In the grid, encircle the event that the 1<sup>st</sup> ball is Red and 2<sup>nd</sup> ball is White. Find its probability.

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(b) If the second ball is taken out, after replacing it while the 1<sup>st</sup> ball is White and without replacing it while the 1<sup>st</sup> ball is Red,

(i). Complete the following tree diagram.



(ii). Find the probability of the first ball being Red and the second ball being White.

5. (a) The description of the height of rose plants in a rose garden is given below.

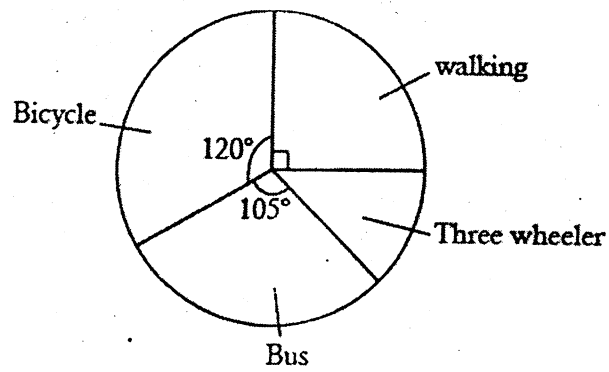
Height (cm)	20 – 25	25 – 30	30 – 40	40 – 45	45 – 50
Number of plants	3	5	12	7	4

(i). Find the number of plants in the garden.

(ii). Illustrate this information in a histogram.

(iii). Draw The frequency polygon on this histogram.

(b) The given pie chart shows the information about the method of transport of the students in a certain school.



(i). What fraction of total students come to school by bicycle.

(ii). If 420 students come to school by bus, find the total number of students in the school.

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II

Three Hours

Part - A

1. An incomplete table to draw the graph of the function  $y = (x - 2)^2 - 3$  is given below.

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

- a). (i) Find the value of  $y$  when  $x = 2$
- (ii) Draw the graph of the function on a graph paper into a suitable scale.
- b). (i) Write the equation of the axis of symmetry.
- (ii) Write down the interval of values of  $x$  for which  $y \geq 1$
- (iii) Write the coordinates of the turning point
- (iv) Find the value of  $\sqrt{3}$  with the value of  $x$  for which  $y = 0$ .

2. An electrical instrument priced at Rs.30 000 can be purchased by making a down payment of Rs.8 000 and paying the remainder by 20 equal monthly installments. If an annual interest rate of 18% is charged on the loan, where the interest is calculated on the reducing balance, find the value of a monthly installment.

3. A table with information on the amount of rice that was sold during a period of 40 days at a shop.

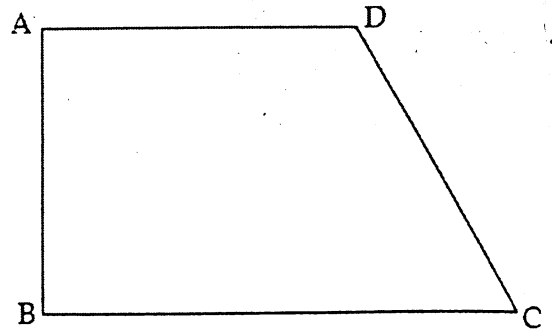
Amount of rice (Kg)	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65
Number of days	3	5	7	12	6	4	3

- (i). What is the model class?
- (ii). By taking the mid-value of the model class as the assumed mean, calculate the mean amount of rice sold in a day.
- (iii). The owner of the shop sold, "340 Kg of rice is sufficient for the next 7 days". Do you agree his statement? Give reason.



4.  $AD \parallel BC$  in the trapezium ABCD.  $\hat{A}BC = 90^\circ$ ,  
 $AB = x \text{ cm}$ ,  $BC = (x + 1) \text{ cm}$  and  $AD = 3 \text{ cm}$

If the area of the trapezium is  $12 \text{ cm}^2$ , find the length of  $AB$ . ( $\sqrt{7} = 2.64$ )



5. An archaeological team reached the foothill  $P$  after travelling  $2.5 \text{ Km}$  on a bearing of  $070^\circ$  from their camp  $C$ . They then travelled  $1.5 \text{ Km}$  on a bearing of exploration  $A$ .

*340° to reach P*

- (i). Draw the rough sketch based on the above information.
- (ii). The second day, they wanted to use an alternative route. They reached the pond, ( $T$ ) located directly East of camp ( $C$ ) and directly south of the foothill, and traveled in North direction then reached the place  $P$ . Answer the following questions using trigonometric ratios.
  - a). How far the pond  $T$  is located from the camp  $C$ .
  - b). How far the mountain  $P$  is located from the pond  $T$ .
  - c). Find the bearing of  $A$  from the camp  $C$ .

6. (a) For visiting a botanical garden, Rs.15 for a Sri Lankan citizen and Rs.50 for a foreign citizen are charged as entrance fee. The manager said that the income for a particular Day was Rs.1 750 and the difference between Sri Lankans and foreigners who came that day was 30.

- (i). Construct a pair of simultaneous equation by taking the number of Sri Lankans as  $x$  & number of foreigners as  $y$ .
- (ii). By solving the equations, find the number of Sri Lankans and foreigners separately.

- (b) If matrix  $A = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ ,  $B = (1 \quad -3)$ , find the matrix  $AB$ .

- (a) The figure shows the members of fitness team standing in semi-circles during **Saarc sports meet**. The number of members in the 1<sup>st</sup> curve is 3. In the next semi-circles, there are 4 more members than before.



(i). How many members are in the 12<sup>th</sup> curve?

(ii). How many members are there in 12 semi-circles, including the leader?

(iii). If the total number of members excluding the leader is 903, how many curve are there?

(b) Find the 7<sup>th</sup> term of the geometric progression

4, 12, 36, ...

8. Use only cm/mm straight edge and a pair of compass to construct the following

(i). Construct the triangle  $ABC$  such that  $AB = 6\text{ cm}$ ,  $BC = 7.5\text{ cm}$  and  $\hat{A}BC = 90^\circ$ .

(ii). Construct the perpendicular bisector of the side  $AB$ .

(iii). Construct the perpendicular bisector of the side  $BC$ .

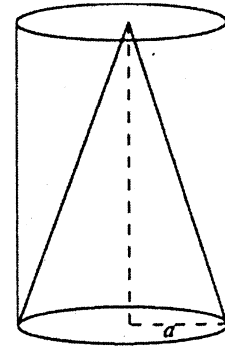
(iv). Name the point of intersection of the bisectors and  $AC$  as  $O$ .

(v). Draw a circle with the center  $O$  and the radius  $OA$ .

(vi). Measure and write the radius of the circle.

(vii). What is the name given to the circle in relation to the triangle?

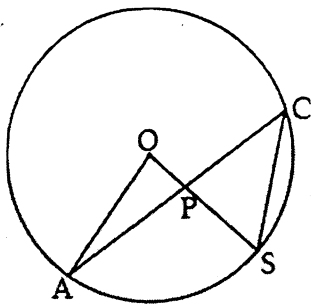
9. (a) The radius of the solid cone is  $a$  and its height is twice of its radius. A cylinder with the same radius and the same height of the cone, is filled with water, and the cone is immersed into it.



Show that the volume of the remaining water is  $\frac{4}{3}\pi a^3$

- (b) If  $\pi = 3.142$ ,  $a = 3.24$ , find the volume of the remaining water using the logarithm table.

10.



In the given figure,  $O$  is the center of the circle.  $A, S, C$  are the points on the circle.  $OA \parallel CS$ , the lines  $AC$  and  $OS$  intersect at  $P$ .

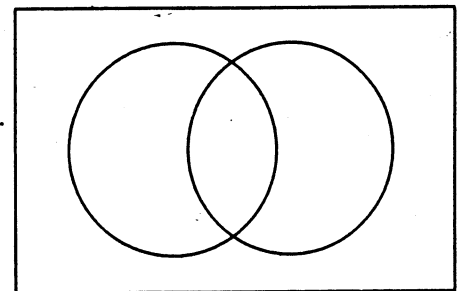
(i). Show that  $\widehat{APS} = 3\widehat{ACS}$

(ii). Show that  $\widehat{OAS} = 90 - \widehat{ACS}$

11. Out of 50 employees working in an office, 20 are men. Twenty-five employees had umbrellas and 19 women did not have umbrellas.

(i). Represent the information in the given Venn diagram.

(ii). Find the following using the Venn diagram.



a). How many men did not have umbrellas?

b). How many men had umbrellas?

c). During an employee is selected randomly, find the probability for the person being a women having umbrella.

12. In triangle  $PQR$ ,  $S$  and  $T$  are the mid-points of the sides  $QR$  and  $PS$  respectively. The straight line through  $T$  drawn parallel to  $PQ$ , intersects the sides  $PR, QR$ , at  $X, Y$  respectively. Show that  $4XY = 3PQ$ .

*T is the mid point of PS*