



**S. THOMAS' COLLEGE
MOUNT LAVINIA**

32

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Pre – Ordinary Level Examination, November 2016

Mathematics I

Two hours only

❖ Answer *All* questions in *Part A* and *Part B*

Part A

1. 13, 10, t , 4 are four successive terms of an Arithmetic Progression.

(a) Which of the following is the common difference?

(i) 13 (ii) 3 (iii) -3 (iv) $\frac{10}{13}$

(b) What is the value of t ?

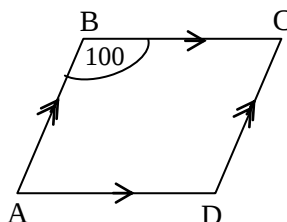
2. Factorise $x^2 + 6x + 5$

3. Solve $\frac{x+2}{3} = 2$

4. ABCD is a rhombus as shown in the diagram. If $\angle ABC = 100^\circ$, find the magnitudes of

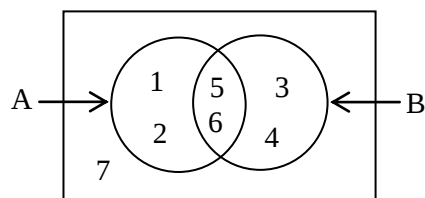
(i) $\angle ADC$

(ii) $\angle BAC$



5. $\frac{5}{7}$ of a tank is filled with water. In order to fill the tank completely, a further 400l is required. Find the capacity of the tank in litres.

6. Using the given figure, answer the following questions.



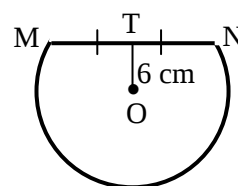
- (i) Write the elements of the Set $(A \cap B)$
(ii) How much is $n(A) + n(B)$?

7. Simplify $\frac{3}{k} - \frac{2}{2k} + \frac{1}{k}$

8. $A = \begin{pmatrix} -3 & 5 \\ 5 & 2 \end{pmatrix}$

- (i) What special name is given to the above square matrix?
(ii) Write down the order of the matrix A.

9. As shown in the figure, T is the mid-point of the chord MN in the segment. If the radius of the circle is 10cm, find the length of the chord MN.

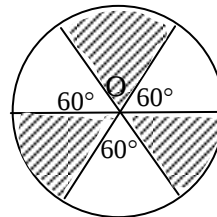


10. Find the value of $\log_5 25 + \log_3 9$ using the values given in the table.

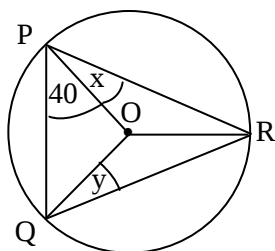
Number	25	9
As a power	5^2	3^2

11. 4 men can complete a certain work in 6 days. How many days would it take for 3 men to complete a work which is twice as much as before?

12. The given diagram shows a circle with centre O and radius 7cm
Find the area of the shaded portion.



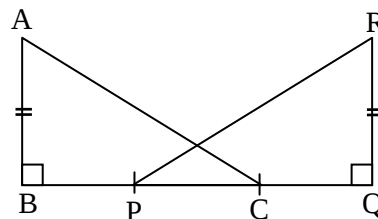
13.



O is the centre of the given circle. If $\angle POQ = 40^\circ$, find the value of $(x + y)$

14. If $AB = QR$ and $BP = CQ$ in the given diagram,

- Write the instance which makes the triangles ABC and PQR congruent.
- Find an angle which is equal to $\angle ACB$ from the triangle PQR



15. What is the expression $(p-2)^2$ equal to?

- $p^2 + 4$
- $p^2 - 4p + 4$
- $(2 - p)^2$
- $p^2 + 4p + 4$

16. A man took a loan of Rs.10,000/- on an annual compound interest rate of 10%. He had to pay Rs.1,100/- as the interest for the second year.

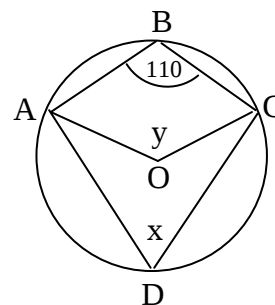
- What is the interest he has to pay at the end of the first year?
- What is the total amount he has to pay at the end of the second year in order to be released from the loan?

17. The points A, B, C and D are lying on the circumference of a

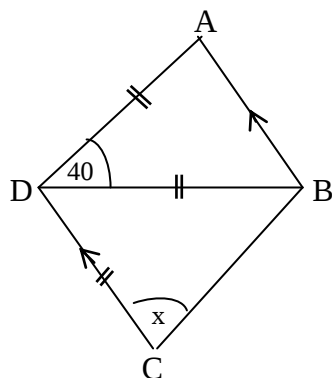
Circle of which the centre is O. If $\angle ABC = 110^\circ$

(i) Find x

(ii) Find y

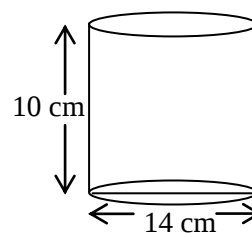


- 18.

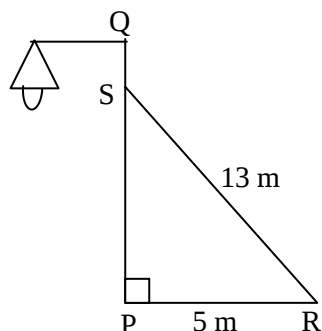


Using the data in the given figure, find the value of x.

19. The figure shows a tin where a label is to be pasted on the curved face.
Using the data in the figure, find the maximum area which the label can take.
(circumference of a circle = $2\pi r$)



- 20.



A vertical lamp post is tied to the ground by a wire. One end of the wire is fixed at a point S 1m below the top of the post Q and the other end to a point 5m away from the foot of the lamp post as shown in the figure. If the wire is 13m in length find the height of the lamp post

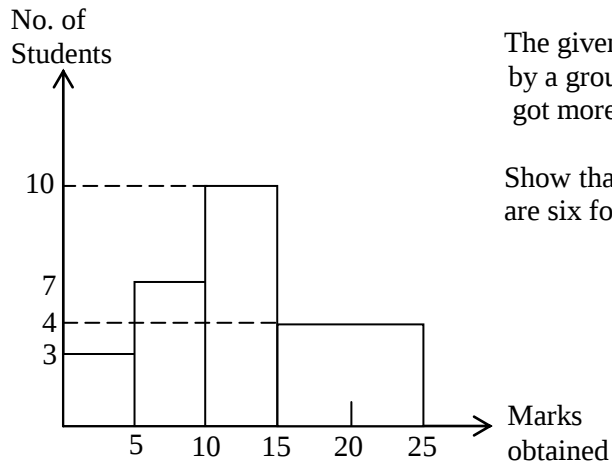
21 If the event of getting a prime number randomly from the following set is “A”,

$$\varepsilon = (1, 2, 3, 4, 5, 6)$$

(i) is “A” a simple event or a composite event?

(ii) Find $p(A)$

22.



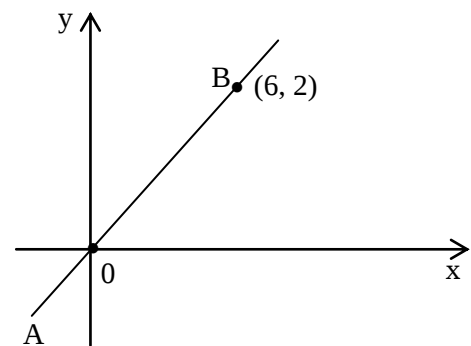
The given histogram shows the marks received by a group of students. How many students have got more than 10 marks?

Show that the number of students got more than 10 marks are six folds of the students got lesser than 5 marks

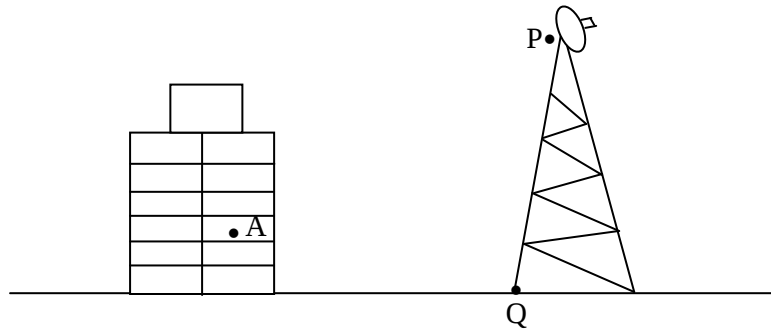
23. Using the data in the diagram, find

(i) the gradient of the graph

(ii) the equation of the graph in the form of $y + mx = 0$



24. The diagram shows a building and a telephone tower situated on the same horizontal ground. A child stands at point A, and the top and bottom of the tower are marked as P and Q respectively.

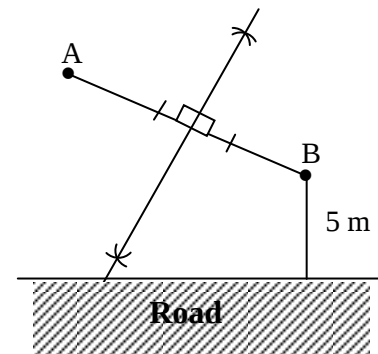


Mark the following statements as (x) if false and (✓) if true.

- (i) A to P is the angle of elevation. ☐
- (ii) Q to A is the angle of depression. ☐
- (iii) The angle of depression from A to Q and the angle of elevation from Q to A are equal. ☐

25. According to the given diagram, A and B are two houses situated the same side of a straight road. The distance from the road to the house B is 5m. It is required to locate a lamp post according to the given requirements.

- (i) Equidistant to both A and B
- (ii) 3m from the road and on the same side as the houses A and B.



Using the knowledge of loci, mark the location of the lamp post in the given diagram.

Part B
Answer all the questions on this paper itself

1. (a) Solve $\frac{3}{5}$ of $\left(2\frac{1}{4} - 1\frac{5}{6}\right)$

(b) An opportunity arose for Prasad to represent the country in an international competition. The school agreed to pay $\frac{1}{2}$ of the total cost for the trip, while $\frac{2}{3}$ of the remaining was collected from friends and relatives. The balance was given by the parents.

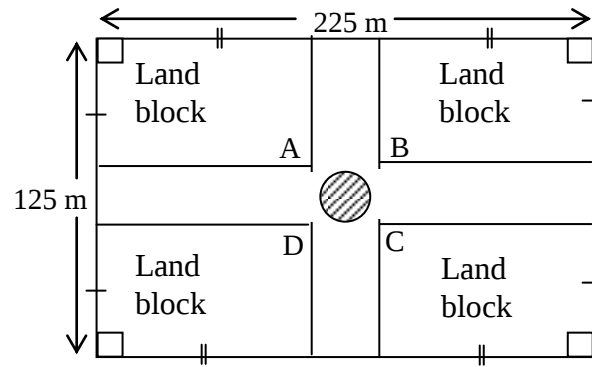
(i) What fraction of the total cost did the friends and relatives donate?

(ii) If the amount received from the relatives was $\frac{1}{6}$, what fraction of the total cost was donated by the friends?

(iii) If the amount donated by the friends was Rs.60,000/- find the total cost of the trip.

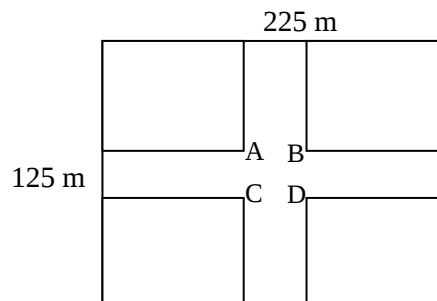
(iv) Show that the amount given by the relatives and the amount given by the parents is the same.

2.



The above diagram shows a plan of a round-about located in a certain city. Two roads 25m wide, crossed each other in the middle. The round-about is a circle of radius 7m.

- (i) Find the area of one land block
- (ii) Calculate the area which has been lost from the roads due to the round-about.
- (iii) Calculate the area of the roads **without** the round-about.
- (iv) It was decided to install a traffic lights system in order to reduce the traffic. The round-about was thus removed and four right angular isosceles triangles with the area 18m^2 each were acquired at the points A, B, C & D to expand the round about as the right angles coincide with the A, B, C and D points. Draw the new plan of the new road system with the measurements on the following diagram



- (iv) Each owner of the acquired land were paid Rs.500,000 per square metre as compensation. Show that the total compensation paid was 36 million rupees.

3. (a) A man takes a loan of Rs.12,000/- at an annual simple interest rate of 12%. After six (06) months, he took another loan of Rs.8,000/-. After one year from taking the first loan, he paid Rs.22,040/- to get released from both loans.

(i) What is the total interest should be paid at the end of one year for the loan of Rs.12,000/-

(ii) What is the total interest should be paid for the loan of Rs.8000/-?

(iii) Show that the interest rate of the second loan is 15% per annum

(b)

Assessment tax rate = 8%

Payable in quarterly instalments

If the annual assessment tax is paid before the 31st of January, then a rebate (discount) of 10% will be given

Mayor

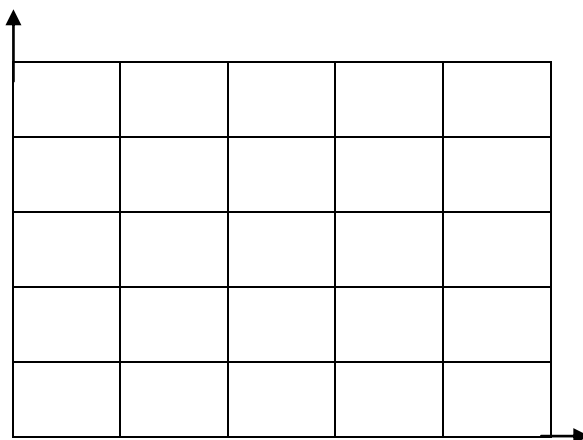
The above notice was displayed at the Municipal Council.

(i) How much should be paid for a quarter for a shop which is assessed at Rs.80,000/-?

(ii) If the annual assessment tax is paid before the 31st of January, find the total amount which should be paid.

4. (a) One card is picked from a pack of unbiased cards numbered from 1 to 5. Having replaced the first card, the second card is picked. A number is formed by placing the 1st number in the 10's place and the 2nd number in the unit place.

- (i) Represent the sample space of the above experiment in the given Cartesian grid.



- (ii) Find the probability that the two digit number obtained would be a multiple of 11

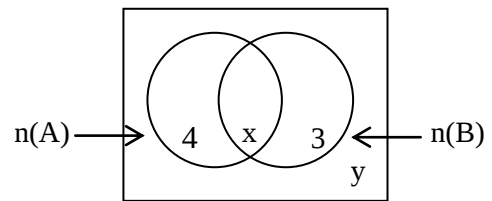
- (iii) What is the probability of both picked cards being even numbers

- (iv) What is the probability of obtaining two digit even number?

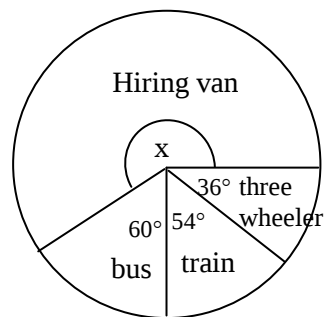
- (b) Represent the events of the above sample space in the given Venn diagram
 $A = \{\text{multiples of 5}\}$ $B = \{\text{multiples of 7}\}$ $n(A \cup B) = 7 + x$

(i) Find the values of x and y .

(ii) Express the set A in builder method



5. (a) The given pie chart represents the modes of transport used by tourists in order to visit Nuwara Eliya on a certain day.



- (i) Find the angle x which represents the tourists who used hired vehicles.
- (ii) If the number of tourists who used buses is 40, then find the total number of tourists who arrived in Nuwara Eliya in that day.
- (iii) Express the number of tourists who used Three Wheelers as the mode of transport as a percentage of the total number of tourists.

(b) Given below are the number of months worked by a set of employees in a company.
120, 90, 82, 26, 48, 50, 60, 12, 24, 36, 155.

(i) Find the inter-quartile range of the above data

(ii) It was decided to pay a special allowance to the employees who have served the company more than the median service period. How many employees would be selected for this allowance?

