

General Certificate of Education (Ordinary Level) Support Seminar - 2018

Mathematics I

2 hours

- Answer all questions in the paper itself.
- It is necessary to indicate the relevant **steps** and **correct units** in answering the questions.
- Marks will be awarded as follows:

In Part A

2 marks for each question.

In Part B

10 marks for each question.

PART A

Answer all questions in the paper itself.

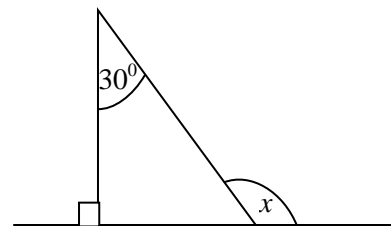
1. A value added tax (VAT) of 15% is charged on the selling price of mobiles. If the selling price a mobile phone is Rs. 24 000, find the amount to be charged as tax (VAT).

2. Express $\lg 1000 = 3$ in index form.

3. Find the lowest common multiple of the following algebraic expressions.

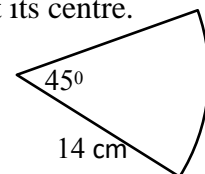
$$4x^2y, 6x, 3y^2$$

4. Find the value of x .



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

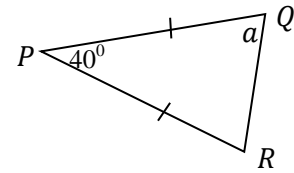
6. Find the arc length of a sector of radius 14 cm with an angle of 45° at its centre.



7. Find the 21st term of the arithmetic progression 7, 12, 17,

8. Five men work for three days to complete $\frac{1}{4}$ of a certain work. Find the number of days required for 10 men to complete the whole work.

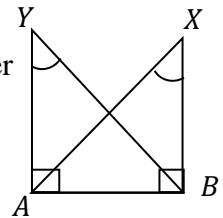
9. According to the given data in the figure find the value of a .



10. Area of the curved surface of a right circular cylinder of base radius 7 cm is 880 cm^2 . Find its height. (The area of the curved surface of a right circular cylinder with base radius r and height h is $2\pi rh$. Take $\pi = \frac{22}{7}$)

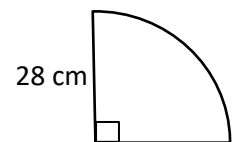
11. According to the data shown in the diagram, underline the state under which the triangles ABY and ABX are congruent.

- (i) S,S,S (ii) S,A,S (iii) A,A,S (iv) R,H,S



12. Simplify: $\frac{2x^2}{y} \div \frac{4x}{5y}$

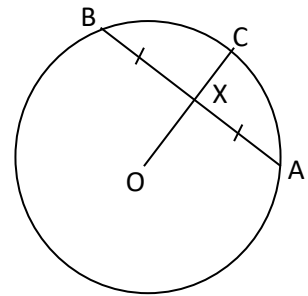
13. Find the area of a sector of radius 28 cm and an angle of 90° at the centre.



14. Write the largest possible integer which satisfies the inequality, $x + 1 < -3$.

15. Solve: $\frac{1}{x} + \frac{1}{2x} = \frac{1}{6}$

16. This is a diagram of a circle with centre O and radius 10cm. X is the midpoint of the chord AB. If the length of AB chord is 16 cm, find the length of XC.

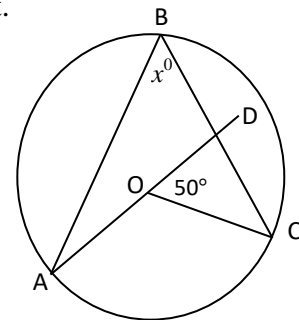


17. If $n(\varepsilon) = 15$, $n(B) = 7$, $n(A \cup B) = 10$ and $n(A \cap B) = 2$ find;

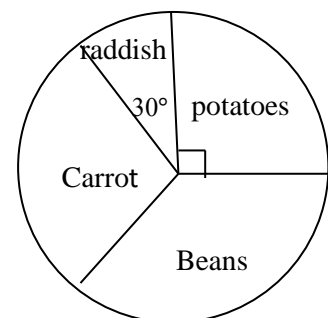
i. $n(A)$

ii. $P(A)$

18. The centre of this circle is O and AD is a straight line segment. Find the value of x , based on the given data.

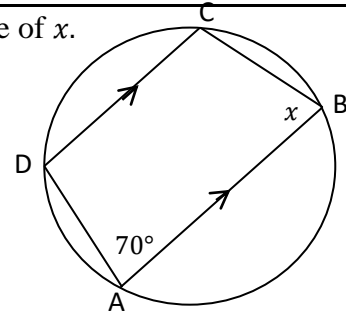


19. This pie chart shows data collected from 180 farmers on their cultivation. If the number of farmers who cultivated carrots and beans are equal, find the number of farmers who cultivated carrots.

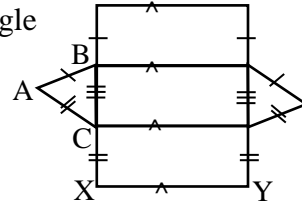


20. A fair cubical dice numbered from 1 to 6, is tossed and the side which turns up is observed.
- i. What is the probability of obtaining 6 ?
- ii. What is the probability of obtaining 6 or 5 ?

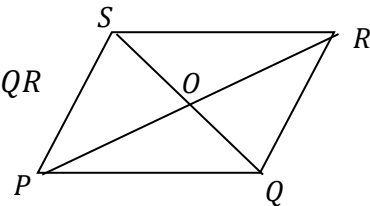
21. According to the data given in the diagram find the value of x .



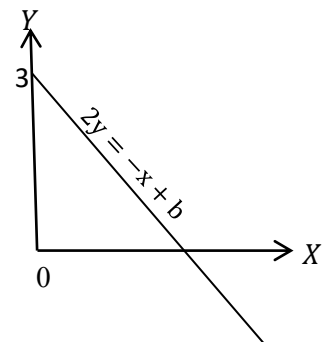
22. The diagram is of a net of a prism. If the area of the triangle ABC is 10 cm^2 and $XY = 1.5 \text{ cm}$ find the volume of the prism that can be made by using this net.



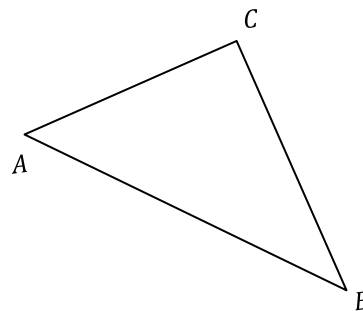
23. $PQRS$ is a parallelogram. If the area of the triangle PQR is 25 cm^2 , find the area of the triangle QRS .



24. If the equation of the given graph is $2y = -x + b$ find the value of b .



25. Following is a rough sketch of a triangular piece of land ABC. Draw the rough construction lines required, to find the point P on AB border which is equidistant to A and C.



Part B

Answer all questions.

1. It is expected to paint $\frac{1}{2}$ of the area of a metal sheet in white colour and $\frac{2}{3}$ of the remainder in silver colour. The remaining portion is expected to be painted in gold colour.

i. What fraction of the whole metal sheet is to be painted in silver colour ?

ii. What fraction of the whole metal sheet is to be painted in gold colour ?

The cost of painting 1 cm^2 of area in white, silver and gold colours is Rs. 10, Rs. 25, Rs. 100, respectively.

iii. If the expected cost of painting in silver is Rs. 400, find the area of the whole metal sheet.

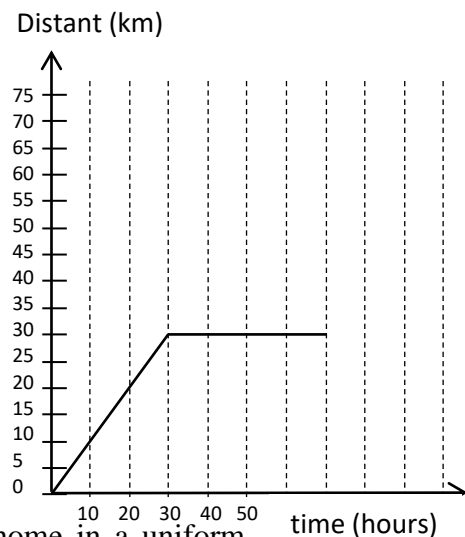
iv. Find the total cost of painting the whole metal sheet as planned above.

2. Following distance-time graph shows the way Nuwan travelled in his vehicle to see a patient in a hospital.

i. What is the distance from Nuwan's house to the hospital ?

ii. What is the speed of the vehicle in kilometres per hour ?

iii. How much time did Nuwan spend in the hospital ?



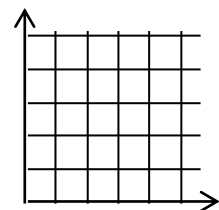
iv. If he travelled along the same route, back to his home in a uniform speed of 90 kmh^{-1} draw the graph for his return journey, on the above distance time graph.

v. Ignore the time spent in the hospital and find the average speed of the vehicle.

3. The market value of a share of a company is Rs. 125.
- Ranjith buys 600 shares of the above company. What is the amount of money he invested in shares ?
 - If Ranjith obtains a dividend of Rs. 9000, find how much the company pays as the annual dividend per share.
 - If a person who has bought shares at the same price, earns an annual dividend of Rs. 24000, find the amount he has invested.
 - At the end of the year Ranjith sells the 600 shares that he owned. The total dividend he earned and the capital gain obtained, sum up to a 28% of his investment. Find the amount at which he has sold a share.

4. There are similar pens in a box of which 3 are red and 2 are blue. Amal randomly takes a pen out of the box. Without replacing it, he takes another pen out.

- Represent the sample space of all the possible outcomes of the above experiment in the given grid.
- Let 'A' be the event of obtaining pens of two different colours. Show the elements of the event A in the grid and find $P(A)$.



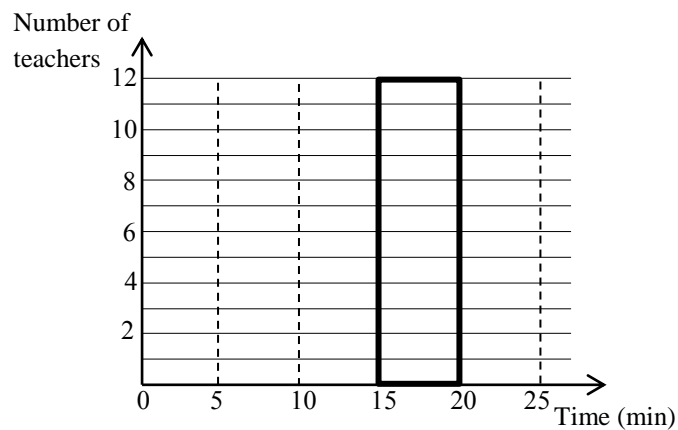
In the above experiment, if Amal takes a pen on his second turn, only if the pen in the first turn is red;

- represent the sample space in a tree diagram.

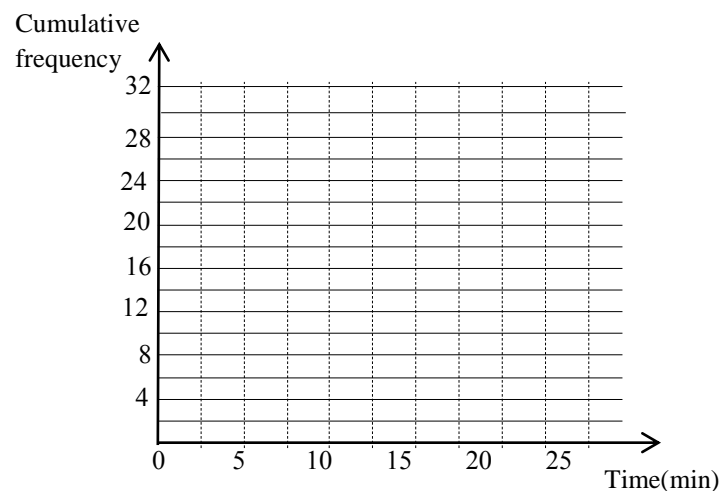
- By using the above tree diagram find the probability of Amal obtaining a blue pen.

5. An incomplete, cumulative frequency distribution and a histogram representing data on the attendance of teachers on a particular day to school, are given below.

Time elapsed since the arrival till the school starts	Number of teachers (frequency)	Cumulative frequency
0-5	3	---
5-10	5	---
10-15	7	---
15-20	---	---
20-25	---	---



- i. If the number of teachers who arrived at the school before the school started is 32, with the use of data in the histogram, complete the frequency column.
- ii. Hence complete the histogram.
- iii. Complete the cumulative frequency column.
- iv. Draw the cumulative frequency curve in the grid below.



- v. Find the median time, of the teachers arriving at school before school starts on this day.