

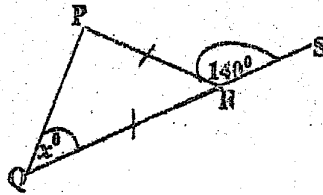


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Part A

• Write down the answers to all the questions on this paper itself

(1) Find the value of x based on the information in the figure.

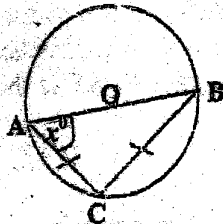


(2) The speed of a bus which is travelling at a uniform speed is 32 kilometres per hour. Find the time it takes to travel 128 kilometres.

(3) If $A = \{\text{multiples of 2}\}$ and $B = \{\text{multiples of 3}\}$ write an element of the set $A' \cap B$.

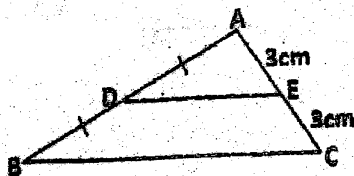
(4) There are 60 identical red and blue balls in a box. The probability of a ball picked at random from this box being blue is $\frac{1}{3}$. How many red balls are there in the box?

(5) The centre of the circle in the figure is O . Find the value of x based on the given information.



(6) Write two integers which are less than 8 which satisfy the inequality $3x - 2 \geq 13$.

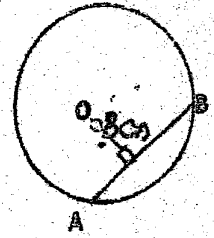
(7) Based on the information in the figure, write two relationships that exist between DE and BC .



(8) Factorize: $3x^2 + 13x - 10$

(9) Find the equation of the straight line which passes through the two points (0,3) and (4, 5).

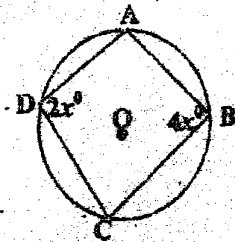
(10) The radius of the circle with centre O in the figure is 5 cm. Find the length of the chord AB based on the given information.



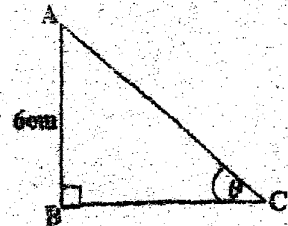
(11) If the surface area of a solid right circular cylinder of base radius 7 cm is 528 cm^2 , find its height. Use $\frac{22}{7}$ for the value of π .

(12) The value of a house has been estimated as Rs 25 000 by the urban council. If the council charges Rs 1250 as rates for a quarter on this house, find the annual rates percentage that is charged.

(13) The points A, B, C and D lie on the circle with centre O as shown in the figure. Find the value of x .

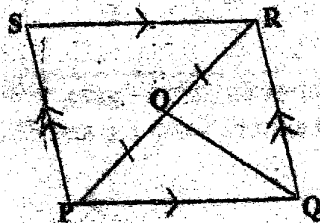


(14) $\sin \theta = \frac{3}{5}$ in the triangle ABC shown in the figure. Find the length of AC based on the given information.

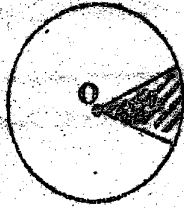


(15) In the figure, $PQRS$ is a parallelogram. The midpoint of PR is O . What fraction of the area of the parallelogram $PQRS$ is the area of the triangle POQ ?

(16) A person who borrowed 6000 rupees on simple interest, settled the loan at the end of a year by paying 6480 rupees. What is the annual simple interest rate that was charged?



(17) The central angle of the shaded sector of the circle with centre O in the figure is 45° . If the area of the circle is 152 cm^2 , find the area of the shaded sector.

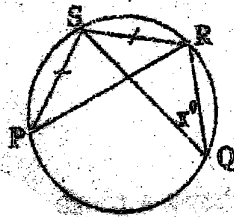


(18) Solve: $\frac{3}{4}x - 1 = \frac{1}{2}$

(19) 5 men can complete a certain task in 8 days. After working 2 days, two of the men fall ill. How many more days will it take the remaining 3 men to complete the task?

(20) The mean of a frequency distribution is 15. The assumed mean is 12.5. Find the mean of the deviations.

(21) P, Q, R and S are four points on the circle in the figure. Also, $PS = SR$. $\widehat{SQR} = x^\circ$, find \widehat{PSR} in terms of x .



(22) Find the least common multiple of the algebraic terms $5y^2, 2xy, 4x$.

(23) Find the value of $\log_2 8 + \log_4 16$

(24) Saman who invested in a company of which a share is 25 rupees, and which pays dividends of 2 rupees per share, received 2000 rupees as dividends at the end of a year. Find the amount he invested in the company.

(25) Find the value of 98^2 by using the factors of $a^2 - 2ab + b^2$.

Answer all questions on this paper itself.

(1) Of a group of students learning either music or art, the fraction that learns art is $\frac{5}{9}$.

(i) What fraction of the group learns music?

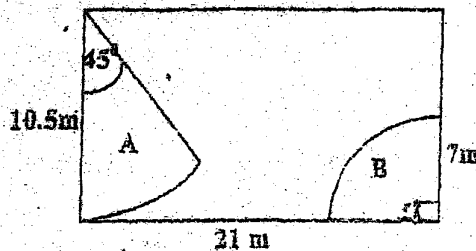
(ii)

$\frac{1}{4}$ of the students who learn music also learn dancing.

By what fraction is the students in the group who learn dancing less than the students who learn art?

(iii) If the number of students who learn music but not dancing is 18, how many students learn music?

(2) The figure shows a rough sketch of a rectangular garden. Flowers have been grown in the two sections named A and B which are in the shape of sectors of circles, and grass has been grown in the remaining section. (Use $\frac{22}{7}$ for the value of π .)



(i) Find the perimeter of the section in which grass has been grown.

(ii) Which of the two sections A and B is of greater area?

- (iii) If a semicircular section of area equal to the difference between the areas of A and B has to be separated out within this garden, find the radius of this semicircle.

(3) (a) Nimal took a loan of 50 000 rupees at an annual compound interest rate of 6%. How much does he have to pay in total at the end of two years to settle the loan?

(b) The initial 1 200 000 rupees of the annual income of a businessman is exempt from tax. An annual tax of 15% is charged on the income above this amount. How much tax does a businessman whose annual income is 2 000 000 rupees have to pay?

(4) There are 150 identical balls in four different colours in a bag. The probability of a ball picked at random from the bag being of a particular colour is given in the following table.

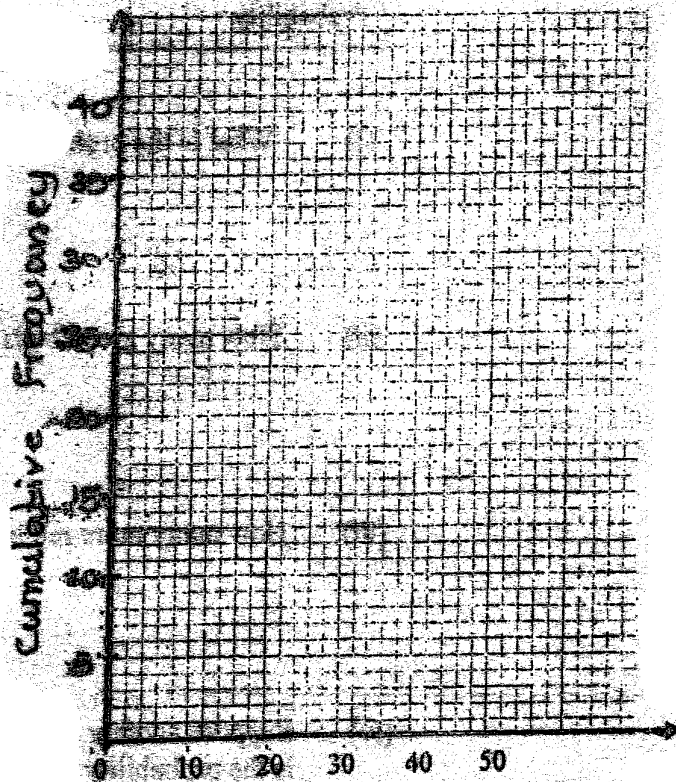
Colour	Blue	Green	Red	Yellow
Probability	0.2	0.3	0.4	...

- (i) What is the probability of a ball picked at random from this box being yellow?
- (ii) How many green balls are there in the box?
- (iii) How many more red balls are there in the box than blue balls?
- (iv) Suppose another 20 red balls identical to the above balls are placed in the box. Now what is the probability of a ball picked at random from the box being red?

- (5) An incomplete table containing information on the masses of several gunny bags of vegetables that were loaded into a lorry is given below.

Mass (kg)	Number of bags (f)	Cumulative Frequency
10 - 20	6	6
20 - 30	...	20
30 - 40	12	...
40 - 50	...	40

- (i) Fill in the blank spaces in the frequency column and the cumulative frequency column.
- (ii) Draw the cumulative frequency curve on the given coordinate plane.
- (iii) Find the median of the masses of the bags.
- (iv) What is the maximum total mass that all the gunny bags in the lorry taken together could be?



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- Select five questions from Part A and five questions from Part B and answer exactly 10 questions.
- Each question carries 10 marks.
- The volume of a right circular cylinder of base radius r and height h is $\pi r^2 h$ and the volume of a sphere of radius r is $\frac{4}{3} \pi r^3$.

Part A

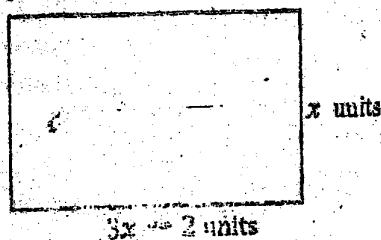
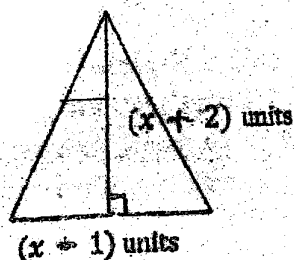
- (1) Sunil deposits 50 000 rupees for a year in a financial institute which pays an annual simple interest rate of 8%. At the end of the year he spends the total amount he receives from the deposit to buy shares worth 25 rupees per share, of a company which pays dividends of 2 rupees a share. If he sells all the shares at 28 rupees per share after receiving the dividends at the end of that year. Find his total income for the two years.

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

x	-3	-2	-1	0	1	2	3	4
y	12	5	0	-3	—	-3	0	5

- (i) Fill in the blank in the table.
 (ii) Using a suitable scale, draw the graph of the above function on the graph paper that is provided.
- (b) Based on the graph,
 (i) find the minimum value of the function.
 (ii) write the interval of values of x for which $y \leq 2$.
 (iii) find the roots of the equation $x^2 - 2x - 3 = 0$.
- (c) Draw the graph of the function $y = -2x$ on the same coordinate plane and hence find the value of $\sqrt{5}$ to the nearest first decimal place.

(3)

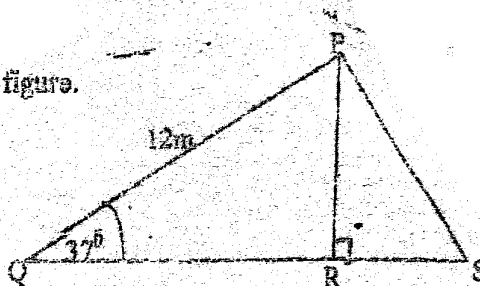


The area of the rectangle in the figure is 11 square units more than the area of the triangle in the figure. Construct a quadratic equation based on this information and by solving it, find the area of the rectangle to the nearest square unit. (Use 4.1 for the value of $\sqrt{17}$.)

(4) (a) Find the following based on the information in the figure.

(i) The length of PR to the nearest 2nd decimal place.

(ii) If the length of RS is 10 m, the magnitude of $\angle PSR$.



(b) AB is a vertical pillar. The angle of elevation of the topmost point of the pillar is 20° when observed from the point C located 50m from A on the horizontal ground on which A is located. Draw a scale diagram to the scale 1:1000 and find the height of the pillar AB .

(5) (a) The cost of 4 books and 5 pencils is 175 rupees. 10 pencils can be bought with the money required for 6 books.

(i) By taking the price of a book as Rs x and the price of a pencil as Rs y , construct a pair of simultaneous equations and by solving them, find separately the price of a book and the price of a pencil.

(ii) Nimal, who has 200 rupees needs to buy these two types of items under the following conditions:

- I. Both books and pencils need to be bought and there should be no money remaining after the purchases.
- II. The maximum number of books that can be purchased under condition I should be bought.

Accordingly, find the number of books and the number of pencils that Nimal should buy.

(b) Find $AB + C$ if $A = \begin{pmatrix} 2 & -1 \\ 0 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 0 \\ -1 & -2 \end{pmatrix}$ and $C = \begin{pmatrix} 2 & 3 \\ 1 & -2 \end{pmatrix}$.

(6) A frequency table of the number of garments that Kanthi who is engaged in a clothing business got sewn during the recent past is given below.

Number of garments	10 - 16	16 - 22	22 - 28	28 - 34	34 - 40	40 - 46	46 - 52
Number of days (Frequency)	3	5	8	10	6	5	3

(i) Which class interval contains the quantities of garments sewn on the most number of days?

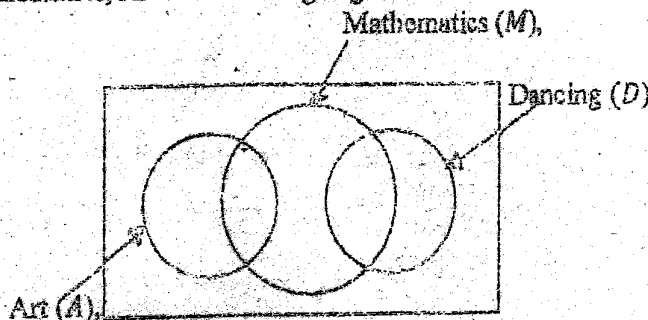
(ii) What is the maximum number of garments that could be expected to be sewn in a day?

(iii) Find the mean of the number of garments that were sewn in a day, to the nearest whole number.

(iv) Kanthi makes a profit of 50 rupees from each garment. She says that if the maximum number of garments possible were sewn every day during the next two months (60 days), instead of the mean number of garments, then she can make an additional profit of at least 50 000 rupees. Do you agree with this? Give reasons for your answer.

Part B

- (7) Sarah plans to construct a fence around his garden by joining 12 wire frameworks together. To construct each framework he needs 14 pieces of wire of lengths 5 cm, 8 cm, 11 cm, ... (where the difference between the consecutive lengths is a constant). He buys 40 metres of wire to construct the whole fence. Give reasons to show whether this quantity is sufficient to construct the fence.
- (8) In the triangle ABC , the angle A is a right angle. The midpoint of the side BC is K . The line drawn parallel to AB through the point K , meets the side AC at L . Draw a figure with this information and show that the triangles KCL and ALK are congruent and that $AK = \frac{1}{2}BC$.
- (9) (a) Find the ratio of the volume of a solid right circular cylinder of base radius $4r$ cm and height $8r$ cm to the volume of a solid sphere of radius $2r$ cm.
- (b) If the volume of the solid sphere of radius $2r$ cm is 256 cm^3 , show that the value of r is given by $r^3 = \frac{24}{3.14}$. (Take the value of π as 3.14)
- (c) Thereby find the value of r to the nearest whole number using the logarithms table.
- (10) Do the following constructions using only a straight edge with a cm/mm scale and a pair of compasses.
- Construct the triangle ABC such that $AB = 7.5 \text{ cm}$, $A = 60^\circ$ and $B = 45^\circ$.
 - Construct the perpendicular bisector of BC .
 - Construct the circle that touches AB at B and passes through the point C , and measure and write its radius.
 - Construct another tangent to this circle from A .
- (11) An incomplete Venn diagram providing information on 50 students who are studying the subjects Mathematics, Art and Dancing is given here.



If the set of students studying mathematics is denoted by M , the set of students studying art is denoted by A and the set of students studying dancing is denoted by D , then,

$$n(A) = 15, n(M) = 35, n(D) = 26, n(A \cap M) = 8 \text{ and } n(M \cap D) = 13.$$

- How many students are studying only mathematics?
- How many students are studying only one subject?
- What is the probability of a student selected at random from this group being a student who is studying only art?
- Shade the region representing $(A \cup M) \cap D$ in the Venn diagram.

(12) The centre of the semicircle shown in the figure is O . Moreover, BE and CD are tangents.

(i) Name two right angled triangles.

Show that,

(ii) $DB = DC = DE$.

(iii) $\angle DCB = \angle CAB$.

(iv) $AB^2 = AC \cdot AE$

