

**SAMPLE PAPER 4**  
**Class 10 - Mathematics**

**Time Allowed: 3 hours**

**Maximum Marks: 80**

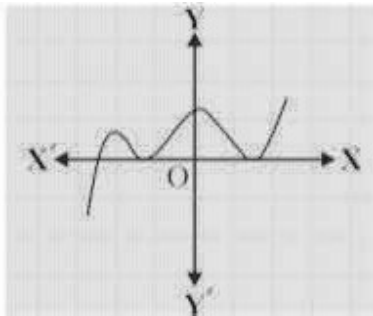
**General Instructions:**

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take  $\pi = \frac{22}{7}$  wherever required if not stated.

**Section A**

1. HCF of 144 and 198 is: [1]
  - a) 18
  - b) 12
  - c) 9
  - d) 6

2. The graph of  $y = p(x)$  in a figure given below, for some polynomial  $p(x)$ . Find the number of zeroes of  $p(x)$ . [1]



- a) 3
  - b) 4
  - c) 2
  - d) 1
3. A system of linear equations is said to be consistent, if it has [1]

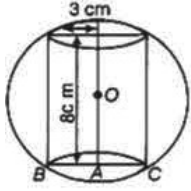




c) 16

d) 17

19. **Assertion (A):** In the given figure, a sphere circumscribes a right cylinder whose height is 8 cm and radius of the base is 3 cm. The ratio of the surface area of the sphere and the cylinder is 6 : 11 [1]



**Reason (R):** Ratio of their surface area =  $\frac{\text{Surface area of sphere}}{\text{Surface area of cylinder}}$

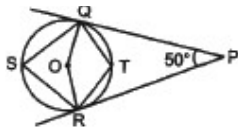
- a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.  
 c) A is true but R is false.      d) A is false but R is true.
20. **Assertion (A):** The sum of the series with the nth term.  $t_n = (9 - 5n)$  is (465), when no. of terms  $n = 15$ . [1]

**Reason (R):** Given series is in A.P. and sum of n terms of an A.P. is  $S_n = \frac{n}{2}[2a + (n - 1)d]$

- a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.  
 c) A is true but R is false.      d) A is false but R is true.

**Section B**

21. If the HCF of 408 and 1032 is expressible in the form  $1032m - 408 \times 5$ , find m. [2]  
 22. In a  $\triangle ABC$ , D and E are points on the sides AB and AC respectively such that  $DE \parallel BC$ . If  $\frac{AD}{BD} = \frac{4}{5}$  and  $EC = 2.5$  cm, find AE. [2]  
 23. In the given figure, find  $\angle QSR$ . [2]



24. If  $\angle A$  and  $\angle B$  are acute angles such that  $\cos A = \cos B$  then show that  $\angle A = \angle B$ . [2]

OR

If  $\sin \theta = \frac{1}{\sqrt{2}}$ , find all other trigonometric ratios of angle  $\theta$ .

25. A chord 10 cm long is drawn in a circle whose radius is  $5\sqrt{2}$  cm. Find the areas of both the segments. [Take  $\pi = 3.14$ .] [2]

OR

A sector of a circle of radius 4 cm contains an angle of  $30^\circ$ . Find the area of the sector.

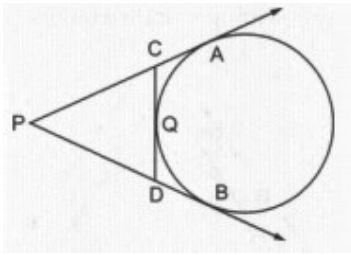
**Section C**

26. Lenin is preparing dinner plates. He has 12 pieces of chicken and 16 rolls. If he wants to make all the plates identical without any food left over, what is the greatest number of plates Lenin can prepare? [3]  
 27. Find the zeroes of the given quadratic polynomials and verify the relationship between the zeroes and their coefficients  $x^2 - 6$ . [3]  
 28. Solve the pair of linear equations by substitution method:  $s - t = 3$ ;  $\frac{s}{3} + \frac{t}{2} = 6$  [3]

OR

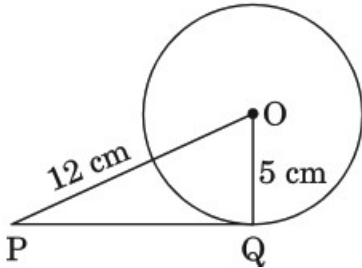
Two years ago father was five times as old as his son. Two years later, his age will be 8 years more than three times the age of the son. Find the present ages of father and son.

29. In figure, PA and PB are tangents to the circle drawn from an external point P. CD is a third tangent touching the circle at Q. If PB = 10 cm and CQ = 2 cm, what is the perimeter of  $\triangle PCD$ ? [3]



OR

- In the figure given below, find the length of the tangent PQ drawn from a point P to a circle with centre at O, given that OP = 12 cm and OQ = 5 cm.



30. ABC is a right triangle, right angled at C. If  $A = 30^\circ$  and AB = 40 units, find the remaining two sides and  $\angle B$  of  $\triangle ABC$  [3]
31. If at some time of the day the ratio of the height of a vertically standing pole to the length of its shadow on the ground is  $\sqrt{3} : 1$ , then find the angle of elevation of the sun at that time. [3]

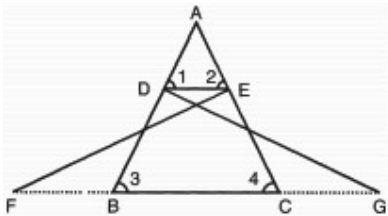
#### Section D

32. If  $x = -4$  is a root of the equation  $x^2 + 2x + 4p = 0$ , find the values of k for which the equation  $x^2 + px + (l + 3k) + 7(3 + 2k) = 0$  has equal roots. [5]

OR

Solve:  $\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = 2, x \neq -\frac{1}{2}, 1$

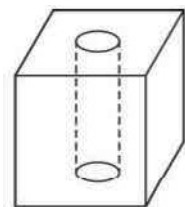
33. In the following figure,  $\triangle FEC \cong \triangle GBD$  and  $\angle 1 = \angle 2$  Prove that  $\triangle ADE \cong \triangle ABC$ . [5]



34. A lead pencil consists of a cylinder of wood with a solid cylinder of graphite filled into it. The diameter of the pencil is 7 mm, the diameter of the graphite is 1 mm and the length of the pencil is 10 cm. Calculate the weight of the whole pencil, if the specific gravity of the wood is  $0.7 \text{ gm/cm}^3$  and that of the graphite is  $2.1 \text{ gm/cm}^3$ . [5]

OR

- In Figure, from a solid cube of side 7 cm, a cylinder of radius 2.1 cm and height 7 cm is scooped out. Find the total surface area of the remaining solid.



35. In the following data, find the values of  $p$  and  $q$ . Also, find the median class and modal class. [5]

Class	Frequency( $f$ )	Cumulative frequency( $cf$ )
100 - 200	11	11
200 - 300	12	$p$
300 - 400	10	33
400 - 500	$q$	46
500 - 600	20	66
600 - 700	14	80

**Section E**

36. **Read the text carefully and answer the questions:** [4]

Students of a school thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class.



- (i) Find total number of trees planted by primary 1 to 5 class students?
- (ii) Find the total number of trees planted by the students of the school.

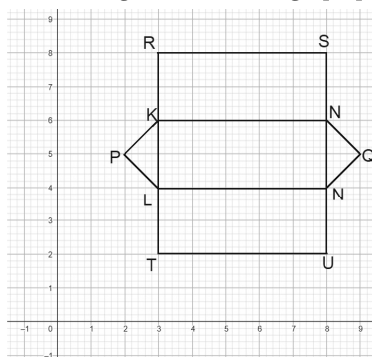
**OR**

Find the total no of trees planted by class 12<sup>th</sup> students.

- (iii) Find the total number of trees planted by class 10<sup>th</sup> student.

37. **Read the text carefully and answer the questions:** [4]

The camping alpine tent is usually made using high-quality canvas and it is waterproof. These alpine tents are mostly used in hilly areas, as the snow will not settle on the tent and make it damp. It is easy to layout and one need not use a manual to set it up. One alpine tent is shown in the figure given below, which has two triangular faces and three rectangular faces. Also, the image of canvas on graph paper is shown in the adjacent figure.



- (i) What is the distance of point  $Q$  from  $y$ -axis?

- (ii) What are the coordinates of U?

**OR**

What is the Perimeter of image of a rectangular face?

- (iii) What is the distance between the points P and Q?

38. **Read the text carefully and answer the questions:**

**[4]**

Over the past 200 working days, the number of defective parts produced by a machine is given in the following table:

Number of defective parts	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Number of days	50	32	22	18	12	12	10	10	10	8	6	6	2	2

- (i) Determine the probability that tomorrow's output will have no defective part?  
(ii) Determine the probability that tomorrow's output will have at least 1 defective part?  
(iii) Determine the probability that tomorrow's output will have not more than 5 defective parts?

**OR**

Determine the probability that tomorrow's output will have more than 5, but less than 8 defective parts?

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