

**SAMPLE PAPER 2**  
**Class 10 - Mathematics**

**Time Allowed: 3 hours**

**Maximum Marks: 80**

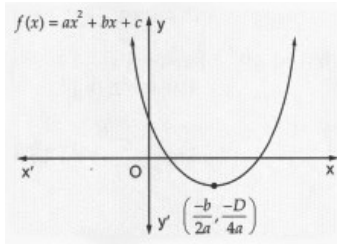
**General Instructions:**

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.

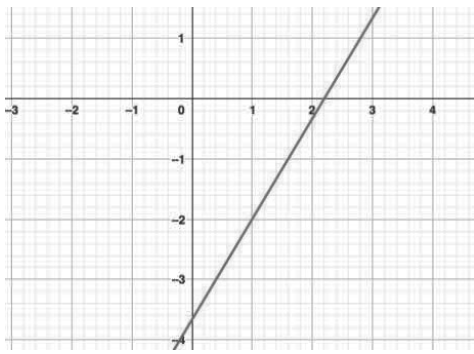
**Section A**

1. If  $n = 2^3 \times 3^4 \times 5^4 \times 7$ , then the number of consecutive zeros in n, where n is a natural number, is [1]
  - a) 2
  - b) 3
  - c) 7
  - d) 4

2. Figure show the graph of the polynomial  $f(x) = ax^2 + bx + c$  for which [1]



- a)  $a > 0, b < 0$  and  $c > 0$
  - b)  $a < 0, b < 0$  and  $c < 0$
  - c)  $a < 0, b > 0$  and  $c > 0$
  - d)  $a > 0, b > 0$  and  $c < 0$
3. The pair of linear equations  $5x - 3y = 11$  and  $-10x + 6y = -22$  are [1]



- a) coincident
- b) None of these
- c) consistent
- d) inconsistent

4. Which of the following equations has 2 as a root? [1]

- a)  $2x^2 - 7x + 6 = 0$
- b)  $3x^2 - 6x - 2 = 0$
- c)  $x^2 + 3x - 12 = 0$
- d)  $x^2 - 4x + 5 = 0$

5. The 10<sup>th</sup> term of the AP: 5, 8, 11, 14, ... is [1]

- a) 185
- b) 35
- c) 38
- d) 32

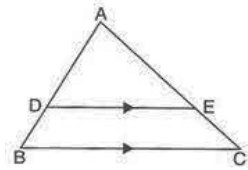
6. The points A (-4, 0), B(4, 0) and C(0, 3) are the vertices of a [1]

- a) isosceles triangle
- b) scalene triangle
- c) equilateral triangle
- d) right triangle

7. If the centroid of the triangle formed by the points (a, b), (b, c) and (c, a) is at the origin, then  $a^3 + b^3 + c^3 =$  [1]

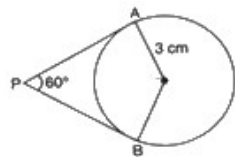
- a) 2a
- b) 0
- c) 3 abc
- d) a + b + c

8. In the given figure,  $DE \parallel BC$ . AB = 15cm, BD = 6cm, AC = 25cm, then AE is equal to [1]



- a) 18 cm.
- b) 20 cm.
- c) 15 cm.
- d) 10 cm.

9. If two tangents inclined at  $60^\circ$  are drawn to circle of radius 3 cm, then length of each tangent is equal to [1]



- a)  $3\sqrt{3}$
- b) 3 cm
- c)  $2\sqrt{3}$  cm
- d)  $3\sqrt{2}$  cm

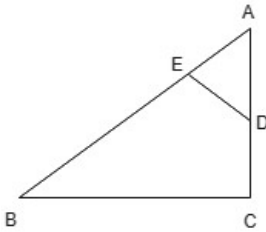
10. AP and PQ are tangents drawn from a point A to a circle with centre O and radius 9 cm. If OA = 15 cm, then AP + AQ = [1]



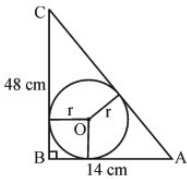
- c) A is true but R is false. d) A is false but R is true.
20. **Assertion (A):** Arithmetic mean between 8 and 12 is 10. [1]  
**Reason (R):** Arithmetic mean between two numbers a and b is given as  $\frac{a+b}{2}$ .
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R 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. In  $\triangle ABC$ , if  $\angle ADE = \angle B$ , then prove that  $\triangle ADE \sim \triangle ABC$ . Also, if  $AD = 7.6$  cm,  $AE = 7.2$  cm,  $BE = 4.2$  cm and  $BC = 8.4$  cm, find  $DE$ . [2]



22. Prove that  $5\sqrt{2}$  is irrational. [2]
23. In the given figure,  $ABC$  is a triangle in which  $\angle B = 90^\circ$ ,  $BC = 48$  cm and  $AB = 14$  cm. A circle is inscribed in the triangle, whose centre is  $O$ . Find radius  $r$  of in-circle. [2]



24. Prove the trigonometric identity: [2]  
 $\tan^2 A + \cot^2 A = \sec^2 A \operatorname{cosec}^2 A - 2$

OR

If  $\tan A = \sqrt{2} - 1$ , show that  $\frac{\tan A}{1 + \tan^2 A} = \frac{\sqrt{2}}{4}$

25. The minute hand of a clock is 10 cm long. Find the area of the face of the clock described by the minute hand between 9 A.M. and 9.35 A.M. [2]

OR

A sector is cut from a circle of radius 21 cm. The angle of the sector is  $150^\circ$ . Find the length of the arc and the area of the sector.

### Section C

26. Mrs. Gupta arranged some snacks for her child's birthday party. After the guest left she had some food left over. She did not want to waste food and so she contacted a local NGO. She gave 60 pieces of pastries, 168 pieces of cookies, and 330 chocolate bars to the team. Now the NGO workers want to make the maximum number of packets with those foods so that no food is left for distributing to the beggars at the roadside. Find the greatest number of packets that they can make. [3]
27. If the coefficient of  $x$  in a quadratic polynomial is zero, then prove that zeros will be equal in magnitude and opposite in sign. [3]
28. If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes  $\frac{1}{2}$  if we only add 1 to the denominator. What is the fraction? Solve the pair of the linear equation obtained by the elimination method. [3]

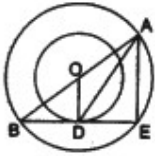
OR

Solve system of equations:

$$3x - \frac{y+7}{11} + 2 = 10$$

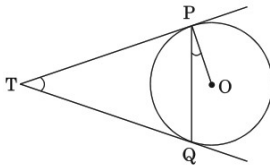
$$2y + \frac{x+11}{7} = 10$$

29. In the given figure, the radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of the bigger circle and BD is a tangent to the smaller circle touching it at D. Find the length of AD. [3]



OR

- In Figure, two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that  $\angle PTQ = 2 \angle OPQ$ .



30. Prove the trigonometric identity:  $\frac{\cot^2 \theta (\sec \theta - 1)}{(1 + \sin \theta)} + \frac{\sec^2 \theta (\sin \theta - 1)}{(1 + \sec \theta)} = 0$  [3]

31. The weights (in kg) of 50 wrestlers are recorded in the following table: [3]

Weight (in kg)	100-110	110-120	120-130	130-140	140-150
Number of Wrestlers	4	14	21	8	3

Find the mean weight of the wrestlers.

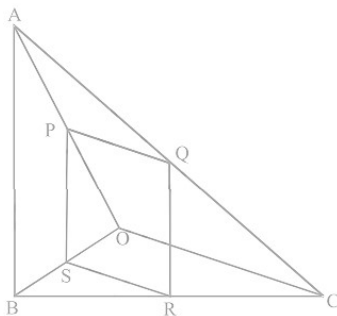
#### Section D

32. Find the value of m for which the quadratic equation  $(m + 1)y^2 - 6(m + 1)y + 3(m + 9) = 0$ ,  $m \neq -1$  has equal roots. Hence find the roots of the equation. [5]

OR

If the roots of the quadratic equation  $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$  in x are equal then show that either  $a = 0$  or  $a^3 + b^3 + c^3 = 3abc$

33. In the figure, if PQRS is a parallelogram and  $AB \parallel PS$ , then prove that  $OC \parallel SR$ . [5]



34. The interior of a building is in the form of cylinder of diameter 4.3 m and height 3.8 m, surmounted by a cone whose vertical angle is a right angle. Find the area of the surface and the volume of the building. (Use  $\pi = 3.14$ ). [5]

OR

A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of cone is 4 cm and the diameter of the base is 8 cm. Determine the volume of the toy. If a cube circumscribes the toy, then find the difference of the volumes of cube and the toy. Also, find the total surface area of the toy.

35. The following are the ages of 200 patients getting medical treatment in a hospital on a particular day : [5]

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
Number of Patients	40	22	35	50	23	30

Write the above distribution as 'less than type' cumulative frequency distribution and also draw an ogive to find the median.

### Section E

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

India is competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in 6th year and 22600 in 9th year.



- (i) Find the production during first year.  
(ii) Find the production during 8th year.

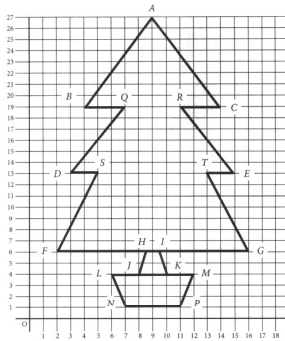
OR

In which year, the production is ₹ 29,200.

- (iii) Find the production during first 3 years.

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

The design of Christmas tree is shown in the following graph:



- (i) What is the distance of point A from x-axis?  
(ii) What is the Length of BC?

OR

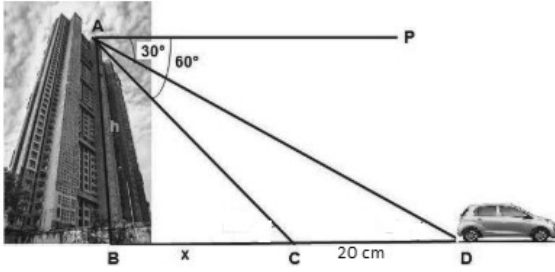
What is the perimeter of its trunk LMPN?

- (iii) What is the Length of FG?

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

Vijay lives in a flat in a multi-story building. Initially, his driving was rough so his father keeps eye on his driving. Once he drives from his house to Faridabad. His father was standing on the top of the building at point A as shown in the figure. At point C, the angle of depression of a car from the building was  $60^\circ$ . After accelerating 20 m from point C, Vijay stops at point D to buy ice cream and the angle of depression changed to

30°.



- (i) Find the value of  $x$ .
- (ii) Find the height of the building AB.

OR

Find the distance between top of the building and a car at position C?

- (iii) Find the distance between top of the building and a car at position D?

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