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## CLASS 10 MATH TEST PAPER 27 (FULL SYLLABUS, 80 MARKS)
Class 10 - Mathematics

Time Allowed: 3 hours   **Maximum Marks: 80**

General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.

2. This Question Paper is divided into 5 Sections A, B, C, D and E.

3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion-Reason based questions of 1 mark each.

4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.

5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.

6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.

7. In Section E, Questions no. 36-38 are case study-based questions carrying 4 marks each with sub-parts of the values of 1,1 and 2 marks each respectively.

8. All Questions are compulsory. However, an internal choice in 2 Questions of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.

9. Draw neat and clean figures wherever required.

10. Take $\pi = 22/7$ wherever required if not stated.

11. Use of calculators is not allowed.

Section A

1. Prime factorisation of 882 is: **[1]**

    a) $2^2 \times 3^3 \times 7$ b) $2 \times 3^2 \times 7^2$

    c) $2^3 \times 3 \times 7^2$ d) $2^2 \times 3^2 \times 7$

2. Find the number of zeroes of p(x) in the graph given below.   **[1]**
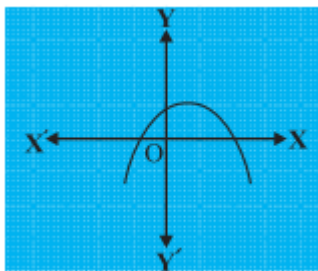
    a) 3   b) 0

    c) 2   d) 1

3. A system of linear equations is said to be inconsistent if it has   **[1]**
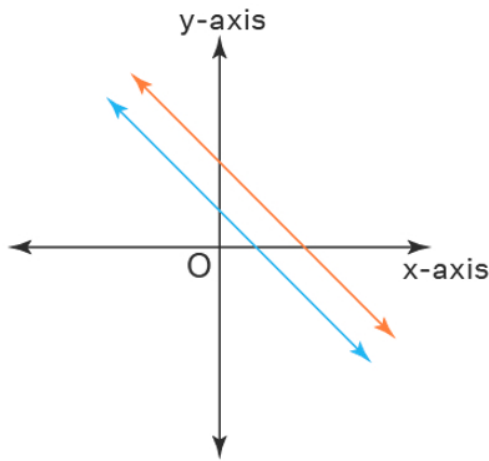
    a) one solution

    c) two solutions

    b) at least one solution

    d) no solution

4. A quadratic equation whose one root is 2 and the sum of whose roots is zero, is **[1]**

    a) $4x^2 - 1 = 0$

    b) $x^2 - 2 = 0$

    c) $x^2 + 4 = 0$

    d) $x^2 - 4 = 0$

5. The next term of the A.P. $\sqrt{18}$, $\sqrt{32}$ and $\sqrt{50}$ is **[1]**

    a) $\sqrt{72}$

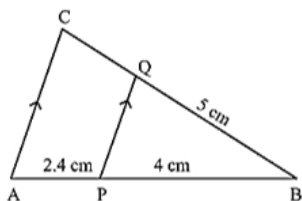   b) $\sqrt{84}$

    c) $\sqrt{64}$

    d) $\sqrt{80}$

6. If the points (x, y), $(1, 2)$ and $(7, 0)$ are collinear, then the relation between x and y is given by **[1]**

    a) 3x - y - 7 = 0

    b) 3x + y + 7 = 0

    c) x + 3y - 7 = 0

    d) x - 3y + 7 = 0

7. If $(3, -6)$ is the mid-point of the line segment joining $(0, 0)$ and (x, y), then the point (x, y) is: **[1]**
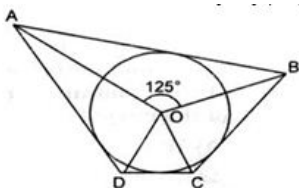
    a) (6, - 6)

    b) (6, -12)

    c) $\left(\frac{3}{2}, -3\right)$

    d) (- 3, 6)

8. In the given figure, PQ ∥ AC. If BP = 4 cm, AP = 2.4 cm and BQ = 5 cm, then length of BC is: **[1]**

    a) 3 cm

    b) $\frac{25}{3}$ cm

    c) 0.3 cm

    d) 8 cm

9. In the given figure, if $\angle AOB = 125^o$, then $\angle COD$ is equal to : **[1]**

    a) 45º

    b) 62.5º

c) 55° d) 35°

10.   A circle of radius 5.2 cm has two tangents AB and CD parallel to each other. What is the distance between the **[1]**
      two tangents?

   a) 10.4 cm   b) can't find

   c) 5.2 cm   d) 20.8 cm

11.   If $\sec\theta + \tan\theta = x$, then $\tan\theta =$ **[1]**

   a) $\frac{x^2+1}{x}$ b) $\frac{x^2+1}{2x}$

   c) $\frac{x^2-1}{x}$ d) $\frac{x^2-1}{2x}$

12. $8\cot^2 A - 8\csc^2 A$ is equal to   **[1]**

   a) -8   b) 8

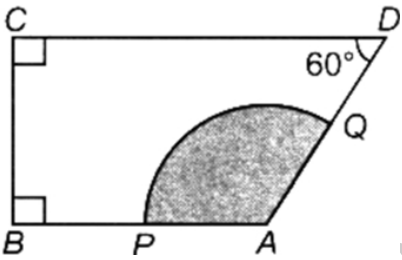   c) $\frac{1}{8}$ d) $-\frac{1}{8}$

13.   The angle of elevation of the sun when the shadow of a pole of height 'h' metres is $\sqrt{3}$h metres long is   **[1]**

   a) 60° b) 45°

   c) 15° d) 30°

14.   If the area of a sector POK is 100π sq.units and angle POK = 49°, then find the radius of sector   **[1]**

   a) $\frac{60\sqrt{10}}{7}$ units   b) $\frac{5\sqrt{10}}{7}$ units

   c) $\frac{6\sqrt{10}}{9}$ units   d) $\frac{9\sqrt{10}}{7}$ units

15.   In the given figure (not drawn to scale), AP = AQ = 3 cm, the area of the shaded region is _____.   **[1]**

   a) 3π cm^2 b) 7π cm^2

   c) 9π cm^2 d) 6π cm^2

16.   A card is drawn at random from a well shuffled deck of 52 playing cards. The probability of getting a face card   **[1]**
      is

   a) $\frac{3}{13}$ b) $\frac{1}{13}$

   c) $\frac{1}{2}$ d) $\frac{4}{13}$
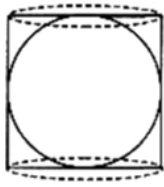
17.   A coin is tossed thrice. The probability of getting at least two tails is   **[1]**

   a) $\frac{4}{5}$ b) $\frac{2}{3}$

   c) $\frac{1}{4}$ d) $\frac{1}{2}$

18.   If the mode of the data: 64, 60, 48, x, 43, 48, 43, 34 is 43, then x + 3 =   **[1]**

   a) 45   b) 48

   c) 44   d) 46

19. **Assertion (A):** In the given figure, a sphere is inscribed in a cylinder. The surface area of the sphere is not equal **[1]** to the curved surface area of the cylinder.

Reason (R): Surface area of sphere is $4\pi r^2$

    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.

20. **Assertion (A):** Sum of natural number from 1 to 100 is 5050. **[1]**

    Reason (R): Sum of n natural number is $\frac{n(n+1)}{2}$.

    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. Find the largest number which divides 438 and 606 leaving remainder 6 in each case. **[2]**

22. In Fig. if $\frac{AD}{DC} = \frac{BE}{EC}$ and $\angle CDE = \angle CED$, prove that $\triangle CAB$ is isosceles. **[2]**
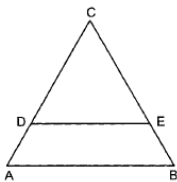
23. In Fig., a circle is inscribed in a $\triangle ABC$ having sides BC = 8 cm, AB = 10 cm and AC = 12 cm. Find the lengths **[2]** BL, CM and AN.
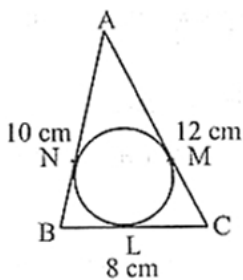
24. Using the formula, $\cos A = \sqrt{\frac{1-\cos 2A}{2}}$ find the value of cos 30°, it being given that cos 60° = $\frac{1}{2}$ **[2]**

OR

Prove that $\frac{(1+\sin \theta)}{(1-\sin \theta)} = (\sec \theta + \tan \theta)^2$

25. The long and short hands of a clock are 6 cm and 4 cm long respectively. Find the sum of distances travelled by **[2]** their tips in 24 hours, (use π = 3.14).

OR

An umbrella has 8 ribs which are equally spaced (see figure). Assuming umbrella to be a flat circle of radius 45 cm, Find the area between the two consecutive ribs of the umbrella.

Section C

26. Renu has collected 8 U.S. stamps and 12 international stamps. She wants to display them in identical groups of U.S. and international stamps, with no stamps left over. What is the greatest number of groups Renu can display them in? **[3]**

27. Find a quadratic polynomial whose sum and product of the zeroes are $-\frac{21}{8}$ and $\frac{5}{16}$ respectively. Also find the zeroes of the polynomial by factorisation. **[3]**

28. Five years ago, Amit was thrice as old as Baljeet. Ten years hence, Amit shall be twice as old as Baljeet. What are their present ages? **[3]**

OR

A part of monthly hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swati takes food for 20 days, she has to pay Rs 3,000 as hostel charges whereas Mansi who takes food for 25 days pays Rs 3,500 as hostel charges. Find the fixed charges and the cost of food per day.

29. In figure, from an external point P, two tangents PT and PS are drawn to a circle with centre O and radius r. If OP = 2r, show that $\angle$OTS= $\angle$OST = 30°. **[3]**
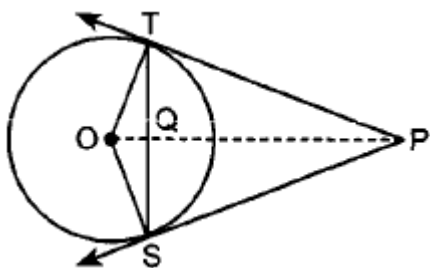
OR

Equal circles with centres O and O' touch each other at X as shown in figure. OO' produced to meet a circle with centre O', at A. AC is a tangent to the circle whose centre is O. O' D is perpendicular to AC. Find the value of $\frac{DO'}{CO}$.
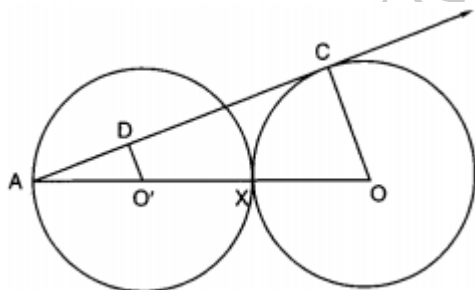
30. If $\left(\frac{x}{a}\sin\theta - \frac{y}{b}\cos\theta\right) = 1$ and $\left(\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta\right) = 1$, prove that $\left(\frac{x^2}{a^2} + \frac{y^2}{b^2}\right) = 2$ **[3]**

31. If the median of the following frequency distribution is 32.5. Find the values of f_1 and f_2. **[3]**

| Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	Total
Frequency	f_1	5	9	12	f_2	3	2	40

Section D

32. If the factory kept increasing its output by the same percentage every year. Find the percentage, if it is known that the output doubles in the last two years. **[5]**

A plane left 30 minutes later than the scheduled time and in order to reach its destination 1500 km away on time, it has to increase its speed by 250 km/hr from its usual speed. Find the usual speed of the plane.

33. PA, QB and RC are each perpendicular to AC. If AP = x, QB = z, RC = y, AB = a and BC = b, then prove that **[5]** $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$.
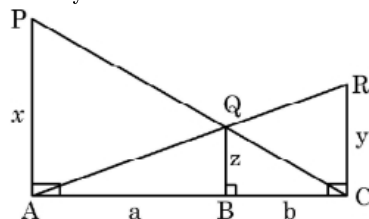
34. In Figure, from a solid cube of side 7 cm, a cylinder of radius 2.1 cm and height 7 cm is scooped out. Find the total surface area of the remaining solid. **[5]**
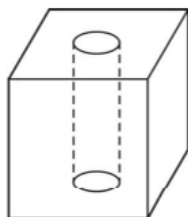
OR

A solid is in the form of a right circular cone mounted on a hemisphere. The radius of the hemisphere is 3.5 cm and the height of the cone is 4 cm. The solid is placed in a cylindrical tub, full of water, in such a way that the whole solid is submerged in water. If the radius of the cylinder is 5 cm and its height is 10.5 cm, find the volume of water left in the cylindrical tub. (Use $\pi = \frac{22}{7}$)

35. Find the value of p, if the mean of the following distribution is 18. **[5]**

x	f
13	8
15	2
17	3
19	4
20 + p	5p
23	6

Section E

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

Sumant's mother started a new shoe shop. To display the shoes, she put 3 pairs of shoes in the 1st row, 5 pairs in the 2nd row, 7 pairs in the 3rd row and so on.

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Based on the above information, answer the following questions:

 i. How many pairs of shoes are displayed in the 6th row? **(1)**

 ii. What is the difference of pairs of shoes in the 1st row and the 6th row? **(1)**

 iii. a. Find the total number of pairs of shoes displayed in the first 15 rows. **(2)**

 OR

 b. If the pairs of shoes displayed in the 4th row are 'on sale' at price of ₹ 500 for each pair, then find the

 total amount (money) earned by Sumant's mother if all shoes displayed in the 4th row are sold out. **(2)**

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

There are two routes to travel from source A to destination B by bus. First bus reaches at B via point C and second bus reaches from A to B directly. The position of A, B and C are represented in the following graph: Based on the above information, answer the following questions.

Scale: x-axis : 1 unit = 1 km

y-axis: 1 unit = 1 km
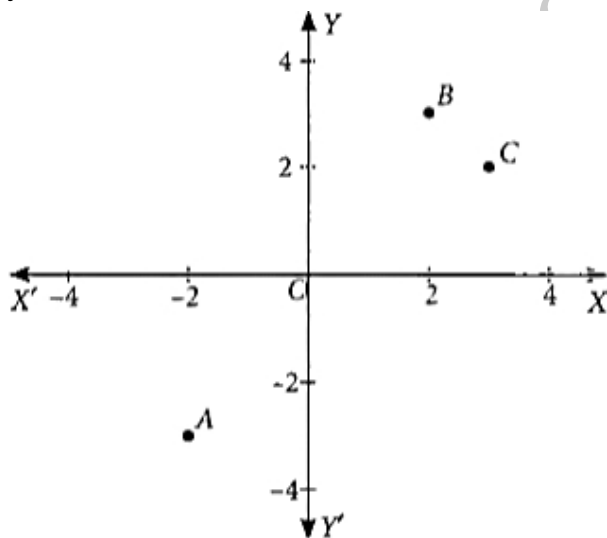
 i. If the fare for the second bus is ₹15/km, then what will be the fare to reach to the destination by this bus? (1)

 ii. What is the distance between A and B? (1)

 iii. What is the distance between A and C? (2)

 OR

 If it is assumed that both buses have same speed, then by which bus do you want to travel from A to B? (2)

38. **Read the following text carefully and answer the questions that follow:** **[4]**

A man is watching a boat speeding away from the top of a tower. The boat makes an angle of depression of 60°

with the man's eye when at a distance of 200 m from the tower. After 10 seconds, the angle of depression becomes 45°.
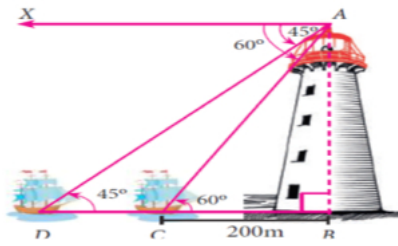
i. What is the approximate speed of the boat (in km/hr), assuming that it is sailing in still water? (1)

ii. How far is the boat when the angle is 45°? (1)

iii. What is the height of tower? (2)

OR

As the boat moves away from the tower, angle of depression will decrease/increase? (2)