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ADARSH PUBLIC SCHOOL (CBSE) VITA

Kundal Road, Bhavaninagar, Vita

CLASS 10 - MATHEMATICS
Practice Examination

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

General Instructions:

1. All questions are compulsory

2. The question paper consists of 40 questions divided into four sections A, B, C & D.

3. Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises 6 questions of 4 marks each.

4. There is no overall choice. However internal choices have been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

5. Use of calculators is not permitted.

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Section A

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1. $x^2 + 2x + 1 = 0$: Discriminant of the given equation is _____ **[1]**

   a) 1 b) 0

   c) 2 d) 4

2. What is a lemma? **[1]**

   a) contradictory statement b) proven statement

   c) no statement d) None ot these

3. If 'a' and 'b' are both positive rational numbers, then $(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b})$ is **[1]**

   a) neither rational nor rational number b) a rational number

   c) an irrational number d) none of these

4. Equal circles with centre O and O' touch each other at P. O and Q' touch each other at P. OO' is **[1]** produced to meet circle (O', r) at A. AT is a tangent to the circle (O, r). O' Q is perpendicular to AT. Then the value of $\frac{AO'}{AO}$ is
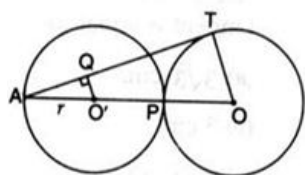
   a) $\frac{1}{2}$ b) $\frac{2}{3}$

   c) $\frac{1}{4}$ d) $\frac{1}{3}$

5. The mean of the first 10 natural odd numbers is **[1]**

    a) 9   b) 12

    c) 11   d) 10

6. 3 rotten eggs are mixed with 12 good ones. One egg is chosen at random. The probability of choosing a rotten egg is **[1]**

    a) $\frac{1}{15}$ b) $\frac{4}{5}$

    c) $\frac{1}{5}$ d) $\frac{2}{5}$

7. The maximum number of zeroes that a polynomial of degree 3 can have is **[1]**

    a) Zero   b) One

    c) Two   d) Three

8. If α and β are zeros of $x^2 + 5x + 8$, then the value of $(\alpha + \beta)$ is **[1]**

    a) -8   b) 8

    c) 5   d) -5

9. If the points (6, 1), (8, 2), (9, 4) and (p, 3), taken in order are the vertices of a parallelogram, then the value of 'p' is **[1]**

    a) 5   b) – 7

    c) 6   d) 7

10. The area of the quadrilateral formed by the vertices (x_1, y_1), (x_2, y_2), (x_3, y_3) and (x_4, y_4) is given by **[1]**

    a) $\frac{1}{2}[x_1(y_2 + y_4) + x_2(y_3 + y_1) + x_3 (y_4 + y_2) + x_4(y_1 + y_3)]$ sq.units

    b) $\frac{1}{2}[x_1(y_2 - y_4) - x_2(y_3 - y_1) - x_3(y_4 - y_2) - x_4(y_1 - y_3)]$ sq.units

    c) $\frac{1}{2}[x_1(y_2 - y_4) + x_2(y_3 - y_1) + x_3(y_4 - y_2) + x_4(y_1 - y_3)]$ sq.units

    d) $\frac{1}{2}[x_1(y_2 + y_4) - x_2(y_3 + y_1) - x_3 (y_4 + y_2) - x_4(y_1 + y_3)]$ sq.units

11. Fill in the blanks: **[1]**

    The distance between the points (10 cos 30⁰, 0) and (0, 10 cos 60⁰) is _____.

12. Fill in the blanks: **[1]**

    The pair of linear equations y = 0 and y = -5 has _____ solutions.

<div align="center">OR</div>

  Fill in the blanks:

    Every linear equation in two variables has _____ number of solutions.

13. Fill in the blanks: **[1]**

    The maximum value of $\frac{1}{\sec\theta}$ is _____.

14. Fill in the blanks: **[1]**

    The value of $3\sin 30^0 - 4\sin^3 60^0$ is _____.

15. Fill in the blanks: **[1]**

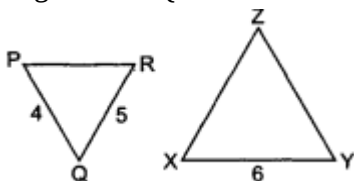In the given figure, if $\Delta ADB \sim \Delta ADC$, then the value of p is _____.
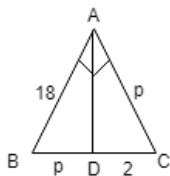
16. Evaluate $2\sin^2 30° - 3\cos^2 45° + \tan^2 60°$. **[1]**

OR

Evaluate $4(\sin^4 30° + \cos^2 60°) - 3(\cos^2 45° - \sin^2 90°) - \sin^2 60°$.

17. Radius of a circle is 1m. If diameter is increased by 100% then find the percentage increase in its area. **[1]**

18. In a simultaneous throw of a pair of dice, find the probability of getting a doubet. **[1]**

19. In figure, $\triangle$PQR ~ $\triangle$XYZ. If PQ = 4 cm, QR = 5 cm and XY = 6 cm, then find YZ. **[1]**

20. Find the 10th term of the AP 2, 7, 12,... **[1]**

Section B

21. In a simultaneous throw of a pair of dice, find the probability of getting 5 as the sum. **[2]**

22. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball, determine the number of blue balls in the bag. **[2]**

23. Prove that the lengths of tangents drawn from an external point to a circle are equal. Using the above prove the following: A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC. **[2]**
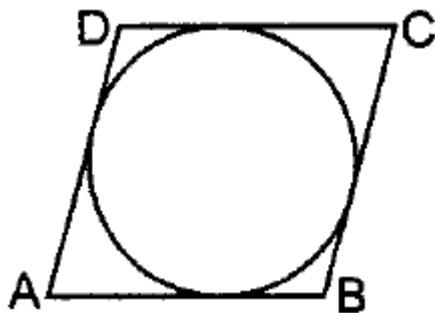
OR

If AB is a chord of a circle with centre O. AOC is a diameter and AT is the tangent at A as shown in figure. Prove that ∠BAT = ∠ACB.
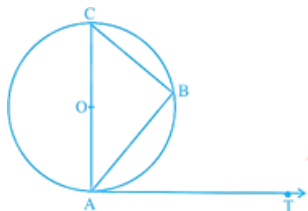
24. Prove the identity: $\dfrac{\sin^2 \theta}{1 - \cos \theta} = \dfrac{1 + \sec \theta}{\sec \theta}$ **[2]**

OR

If a $\cos\theta$ - b $\sin\theta$ = c, prove that a $\sin\theta$ + b $\cos\theta$ = $\pm\sqrt{a^2 + b^2 - c^2}$

25. A sector of 56°, cut out from a circle, contains 17.6 cm². Find the radius of the circle. **[2]**

26. A teacher after teaching the chapter polynomial in class 10th, wrote the sum and product of zeroes respectively on the blackboard to test the skill grasped by his students. Find out the polynomials that the teacher has in his mind. **[2]**

   i. 2 and $\sqrt{2}$
   ii. $2 - \sqrt{2}$ and $2 - \sqrt{7}$
   iii. $\sqrt{3}$ and $-\sqrt{5}$
   iv. $\frac{2}{3}$ and $-\frac{1}{2}$

Section C

27. Find the zeroes of the polynomial $y^2 + \frac{3}{2}\sqrt{5}y$ - 5 by factorisation method and verify the relationship between the zeroes and coefficient of the polynomials. **[3]**

28. Draw a right triangle in which sides (other than the hypotenuse) are of lengths 8 cm and 6 cm. Then construct another triangle whose sides are 3/4 times the corresponding sides of the first triangle. **[3]**

OR

Construct a quadrilateral similar to a given quadrilateral ABCD with its sides $\frac{3}{5}$ the of the corresponding sides of quadrilateal ABCD. It is given that AB = 5.0 cm, BC = 4.8 cm, CD = 4.5 cm, AD = 6 cm and AC = 7.3 cm.

29. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel. **[3]**

30. Prove that $\frac{\cos 58°}{\sin 32°} + \frac{\sin 22°}{\cos 68°} - \frac{\cos 38° \operatorname{cosec} 52°}{\tan 18° \tan 35° \tan 60° \tan 72° \tan 55°} = \frac{6 - \sqrt{3}}{3}$ **[3]**

OR
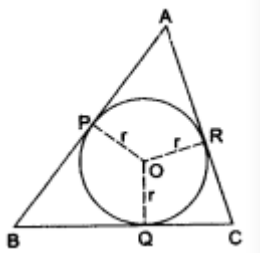
If $1 + \sin^2\theta = 3\sin\theta\cos\theta$, prove that $\tan\theta = 1$ or $\frac{1}{2}$

31. Find the HCF of 65 and 117 and find a pair of integral values of m and n such that HCF = 65m + 117n. **[3]**

OR

Show that $3 + 5\sqrt{2}$ is an irrational number.

32. In the given figure, the sides AB, BC a and CA of a triangle ABC touch a circle with centre O and radius r at P, Q and R respectively. Prove that. **[3]**

   a. AB + CQ = AC + BQ
   b. area $(\triangle ABC) = \frac{1}{2}(\text{perimeter of } \triangle ABC) \times r$.

33. Ayush starts walking from his house to office. Instead of going to the office directly, he goes to a bank first, from there to his daughter's school and then reaches the office. If the house is situated at (2, 4), bank at (5, 8), school at (13, 14) and office at (13, 26) and coordinates are in **[3]**

km., answer the following questions:
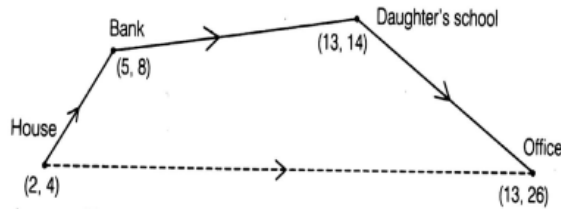
   i. Calculate the distance between Ayush house and bank.
   ii. Calculate the distance between bank and Ayush daughter's school.
   iii. What is the extra distance travelled by Ayush in reaching his office? (Assume that all distance covered are in straight lines).

34. A fraction is such that if the numerator is multiplied by 3 and the denominator is reduced by **[3]** 3, we get 18/11, but if the numerator is increased by 8 and the denominator is doubled, we get 2/5. Find the fraction.

Section D

35. The difference of squares of two numbers is 180. The square of the smaller number is 8 times **[4]** the larger number. Find the two numbers.

36. 200 logs are stacked in such a way that there are 20 logs in the bottom row, 19 in the next row, **[4]** 18 in the next row, and so on. In how many rows 200 logs are placed and how many logs are there in the top row?

OR

If the ratio of the sum of the first n terms of two APs is (7n +1): (4n + 27) then find the ratio of their 9th terms.

37. From the top of a vertical tower, the angles of depression of two cars in the same straight line **[4]** with the base of the tower, at an instant are found to be $45°$ and $60°$. If the cars are 100 m apart and are on the same side of the tower, find the height of the tower.

38. In $\triangle$ABC, if $AD \perp BC$ and $AD^2 = BD \times DC$, prove that $\angle$BAC = 90°. **[4]**

OR

In the given figure , if $DE \parallel BC$ and AD : DB = 5 : 4, then find $\frac{ar(\Delta DFE)}{ar(\Delta CFB)}$
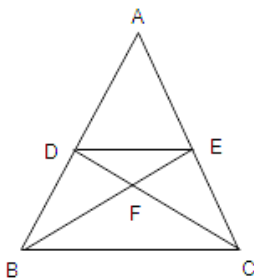
39. A rocket is in the form of a right circular cylinder closed at the lower end and surmounted by **[4]** a cone with the same radius as that of cylinder. The diameter and height of cylinder are 6 cm and 12 cm, respectively. If the slant height of the conical portion is 5 cm, then find the total surface area and volume of rocket. (Use π = 3.14)

OR

A housing society used to collect rain water from the roof of its building 22 m × 20 m to a cylindrical vessel having diameter of base 2m and height 3.5 m and then pump this water into the

main water tank so that all members can use it. On a particular day the rain water collected from the roof just filled the cylindrical vessel. Then, find the height of the roof.

40. The following table gives the height of trees: **[4]**

Height	No. of trees
Less than 7	26
Less than 14	57
Less than 21	92
Less than 28	134
Less than 35	216
Less than 42	287
Less than 49	341
Less than 56	360

Draw 'less than' ogive and 'more than' ogive.