



Vidya Bhawan, Balika Vidyapith

Shakti Utthan Ashram, Lakhisarai - 811311 (Bihar)

Class: - 10th

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Subject: - Mathematics

Quadratic Equation

1. Find the value of k for which the quadratic equation $kx^2 - 5x + k = 0$ have real roots.
2. If -4 is a root of the quadratic equation $x^2 + px - 4 = 0$ and $x^2 + px + k = 0$ has equal roots, find the value of k .
3. For what value of k , does the given equation have real and equal roots?
 $(k + 1)x^2 - 2(k - 1)x + 1 = 0$.
4. Using quadratic formula, solve the following quadratic equation for x :
 $x^2 - 2ax + (a^2 - b^2) = 0$
5. For what value of k are the roots of the quadratic equation $3x^2 + 2kx + 27 = 0$ real and equal?
6. For what value of k are the roots of the quadratic equation $kx^2 + 4x + 1 = 0$ equal and real?
7. Solve the following quadratic equation: $2x^2 + 4x - 8 = 0$
8. Solve for x : $36x^2 - 12ax + (a^2 - b^2) = 0$.
9. Solve: $16x^2 - 8a^2x + (a^4 - b^4) = 0$ for x .
10. Had Ravita scored 10 more marks in her Mathematics test out of 30 marks, 9 times these marks would have been the square of her actual marks. How many marks did she get in the test?
11. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

12. In a class test, the sum of marks obtained by P in Mathematics and Science is 28. Had he got 3 more marks in Mathematics and 4 marks less in Science, the product of marks obtained in the two subjects would have been 180? Find the marks obtained in two subjects separately.

13. Solve for x:

$$\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$$

14. Solve for x:

$$x^2 - 5\sqrt{5}x - 70 = 0$$

15. At t minutes past 2 pm, the time needed by the minute hand of a clock to show 3 pm was found to be 3 minutes less than $\frac{t^2}{4}$ minutes. Find 't'.

16. A train, travelling at a uniform speed for 360 km, would have taken 48 minutes less to travel the same distance if its speed were 5 km/hr more. Find the original speed of the train.

17. If the roots of the equation $(b - c)x^2 + (c - a)x + (a - b) = 0$ are equal, then prove that $2b = a + c$.

18. If the roots of the equations

$$ax^2 + 2bx + c = 0 \text{ and } bx^2 - 2\sqrt{ac}x + b = 0$$

are simultaneously real then prove that $b^2 = 4ac$.

19. If the roots of the equation

$$(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0 \text{ are equal, then prove that}$$

either $a = 0$ or $a^3 + b^3 + c^3 = 3abc$