Precalculus

Topic: Equations

Instructions

Solve the following equations. Show all your steps clearly and provide simplified answers.

Practice Problems

1. **Solve the following linear equations:**
   i. $2x + 5 = 15$
   ii. $3(x - 2) + 4 = 10$
   iii. $\frac{x+3}{2} = 7$
   iv. $5x - 3 = 2x + 9$

2. **Solve the following quadratic equations:**
   i. $x^2 - 5x + 6 = 0$
   ii. $3x^2 + 12x + 9 = 0$
   iii. $x^2 - 4 = 0$
   iv. $2x^2 - 3x - 2 = 0$

3. **Use the discriminant to determine the number of real solutions of the equation (do not solve):**
   i. $x^2 - 4x + 4 = 0$

ii. $2x^2 - 3x + 5 = 0$

iii. $x^2 + 6x + 9 = 0$

iv. $3x^2 - 5x - 2 = 0$

4. **Solve the following equations by completing the square:**

i. $x^2 - 6x + 5 = 0$

ii. $2x^2 + 8x - 10 = 0$

iii. $x^2 + 4x = 7$

iv. $3x^2 - 12x + 9 = 0$

5. **Solve the following equations involving radicals:**

i. $\sqrt{x+2} = 4$

ii. $\sqrt{3x+7} = x$

iii. $2 + \sqrt{x} = 5$

iv. $\sqrt{x+1} + \sqrt{x-1} = 4$

6. **Solve the following absolute value equations:**

i. $|x - 3| = 7$

ii. $2|x + 1| = 8$

iii. $|2x - 5| = 3$

iv. $|x + 4| - 2 = 6$

7. **Solve the following exponential equations:**

i. $2^x = 16$

ii. $3^{x+1} = 27$

iii. $5^{2x} = 25$

iv. $e^x = 7$

8. **Solve the following logarithmic equations:**

i. $\log x = 2$

ii. $\log_2(x + 3) = 3$

iii. $\ln(x) = 1$

iv. $\log_{10}(2x) = \log_{10} 5$

Multiple Choice Questions

Choose the correct answer:

1. Solve $x^2 - 9 = 0$:
   (a) $x = 3$
   (b) $x = \pm 3$
   (c) $x = -3$
   (d) None of the above
2. Solve $|x - 2| = 5$:
   (a) $x = 7$
   (b) $x = -3$
   (c) $x = 7, -3$
   (d) None of the above
3. Solve $\sqrt{x + 4} = 3$:
   (a) $x = 5$
   (b) $x = -1$
   (c) $x = 5, -1$
   (d) None of the above
4. Solve $2^x = 32$:
   (a) $x = 3$
   (b) $x = 4$
   (c) $x = 5$
   (d) None of the above
5. Solve $\log_2(x) = 4$:
   (a) $x = 8$
   (b) $x = 16$
   (c) $x = 32$
   (d) None of the above

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