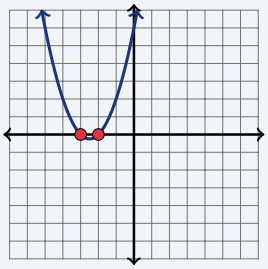
Solving Quadratic Equations by Factoring

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

Set the equation equal to 0, factor the quadratic, then use the *zero-product property*: if a product is 0, at least one factor is 0. So if $(x - p)(x - q) = 0$, then $x = p$ or $x = q$.

▷ **Example:** Solve $x^2+5x+6=0$. **Work:** Factor: $(x+2)(x+3)=0$. Set each factor to 0: $x+2=0$ or $x+3=0$. ★ **Answer:** $x=-2$ or $x=-3$



Roots: where the curve meets the x-axis.

Practice Problems

Solve each equation.

1. $x^2 + 5x + 6 = 0$ _____
2. $x^2 - 7x + 12 = 0$ _____
3. $x^2 + x - 6 = 0$ _____
4. $x^2 - 9 = 0$ _____
5. $x^2 - 5x = 0$ _____
6. $x^2 + 2x - 8 = 0$ _____
7. $x^2 - 4x + 4 = 0$ _____
8. $x^2 + 6x + 9 = 0$ _____
9. $x^2 - x - 12 = 0$ _____
10. $x^2 - 16 = 0$ _____
11. $x^2 + 7x + 10 = 0$ _____
12. $x^2 - 3x - 10 = 0$ _____
13. $x^2 - 8x + 15 = 0$ _____
14. $x^2 + 4x = 0$ _____

Word Problems

15. A square sign has area 4 square feet. If side length is represented by x, solve $x^2 - 4 = 0$ for the possible mathematical values of x. _____
16. A projectile-height model has zeros found by solving $x^2 + 9x + 20 = 0$. Solve for the two zero values. _____
17. A rectangular area model becomes zero at the boundary values of $x^2 - 6x + 8 = 0$. Solve for those values. _____
18. If $(x - 3)(x + 5) = 0$, find all values of x. _____

Answer Keys

1. $x = -2, -3$	**7.** $x = 2$	**13.** $x = 3, 5$
2. $x = 3, 4$	**8.** $x = -3$	**14.** $x = 0, -4$
3. $x = 2, -3$	**9.** $x = 4, -3$	**15.** $x = 2, -2$
4. $x = 3, -3$	**10.** $x = 4, -4$	**16.** $x = -4, -5$
5. $x = 0, 5$	**11.** $x = -2, -5$	**17.** $x = 2, 4$
6. $x = 2, -4$	**12.** $x = 5, -2$	**18.** $x = 3, -5$

Step-by-Step Explanations

1. Start by naming the process: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x + 2)(x + 3) = 0$, so $x = -2$ or -3. So the final answer is $x = -2, -3$.

2. A good way to think about this is: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x - 3)(x - 4) = 0$, so $x = 3$ or 4. So the final answer is $x = 3, 4$.

3. Step by step: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x + 3)(x - 2) = 0$, so $x = 2$ or -3. So the final answer is $x = 2, -3$.

4. Take it one move at a time: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x-3)(x+3) = 0$, so $x = 3$ or -3. So the final answer is $x = 3, -3$.

5. Start by naming the process: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $x(x - 5) = 0$, so $x = 0$ or 5. So the final answer is $x = 0, 5$.

6. A good way to think about this is: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x + 4)(x - 2) = 0$, so $x = 2$ or -4. So the final answer is $x = 2, -4$.

7. Step by step: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x - 2)^2 = 0$, so $x = 2$ (one repeated root). So the final answer is $x = 2$.

8. Take it one move at a time: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x + 3)^2 = 0$, so $x = -3$. So the final answer is $x = -3$.

9. Start by naming the process: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x - 4)(x + 3) = 0$, so $x = 4$ or -3. So the final answer is $x = 4, -3$.

10. A good way to think about this is: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x - 4)(x + 4) = 0$, so $x = 4$ or -4. So the final answer is $x = 4, -4$.

11. Step by step: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x + 2)(x + 5) = 0$, so $x = -2$ or -5. So the final answer is $x = -2, -5$.

12. Take it one move at a time: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x - 5)(x + 2) = 0$, so $x = 5$ or -2. So the final answer is $x = 5, -2$.

13. Start by naming the process: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x - 3)(x - 5) = 0$, so $x = 3$ or 5. So the final answer is $x = 3, 5$.

14. A good way to think about this is: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $x(x + 4) = 0$, so $x = 0$ or -4. So the final answer is $x = 0, -4$.

15. Step by step: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x - 2)(x + 2) = 0$, so $x = 2$ or -2. So the final answer is $x = 2, -2$.

16. Take it one move at a time: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x + 4)(x + 5) = 0$, so $x = -4$ or -5. So the final answer is $x = -4, -5$.

17. Start by naming the process: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is $(x - 2)(x - 4) = 0$, so $x = 2$ or 4. So the final answer is $x = 2, 4$.

18. A good way to think about this is: Factor the quadratic, then use the zero-product property by setting each factor equal to zero. The setup/work is Each factor zero: $x = 3$ or -5. So the final answer is $x = 3, -5$.

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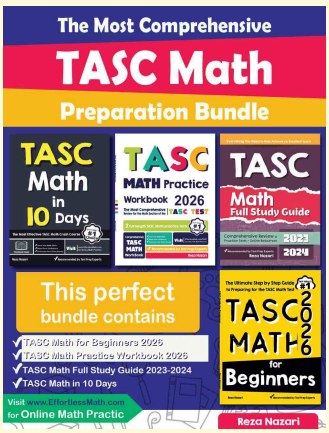

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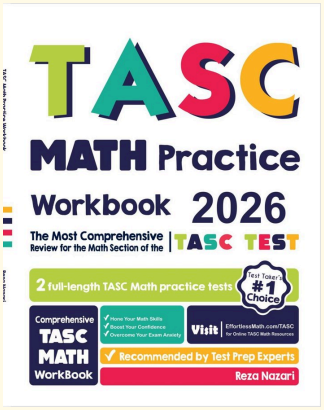

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