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LT 3.1-3.4 Study Guide and Intervention

Solving Quadratic Equations by Graphing

Solve Quadratic Equations

Quadratic Equation	A quadratic equation has the form $ax^2 + bx + c = 0$, where $a \neq 0$.
Roots of a Quadratic Equation	solution(s) of the equation, or the zero(s) of the related quadratic function

The zeros of a quadratic function are the *x*-intercepts of its graph. Therefore, finding the *x*-intercepts is one way of solving the related quadratic equation.

Example: Graph & Solve $x^2 + 2x - 3 = 0$ by graphing.

The *x*-coordinate of the vertex is $x = -\frac{b}{2a} = -\frac{2}{2(1)} = -1$

Make a table of values using *x*-values around -1.

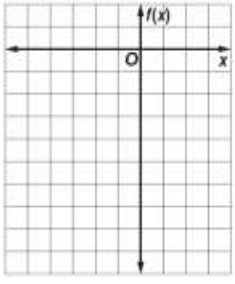
x	–3	– 2	-1	0	1
***f* (*x*)**	0	-3	-4	-3	0

Label the vertex, axis of symmetry, y-intercept, x-intercept and their locations. Maximum or minimum?

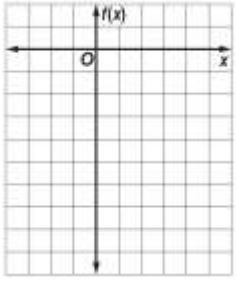
From the table and the graph, we can see that the zeros of the function are -3 and 1. (Solutions: x = -3 & x = 1)

Graph the quadratic function. Label the vertex, axis of symmetry, y-intercept, x-intercept and their locations. Maximum or minimum? Find the solutions (zeros) of the function.

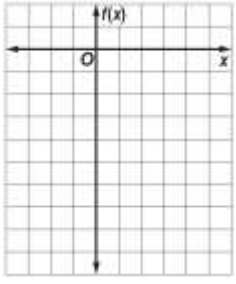
1. $x^2 + 2x - 8 = 0$



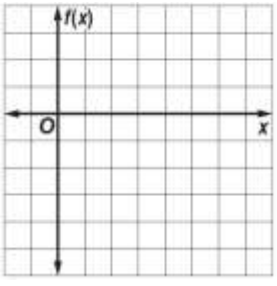
2. $x^2 - 4x - 5 = 0$



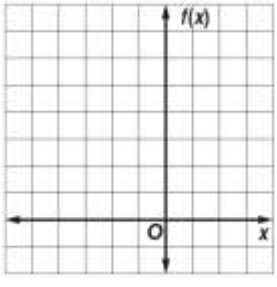
3. $x^2 - 5x + 4 = 0$



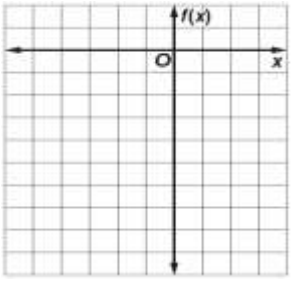
4. $x^2 - 10x + 21 = 0$



5. $x^2 + 4x + 6 = 0$



6. $-x^2 - 6x - 9 = 0$



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LT 3.5-3.6 Study Guide for Midterm

Solving Quadratic Equations by Factoring

Factored Form To write a quadratic equation with roots p and q, let $(x - p)(x - q) = 0$. Then multiply using FOIL.

Example: Write a quadratic equation in standard form with the given roots.

a. 3, –5

$x = 3, x = -5$

$(x - p)(x - q) = 0$	Write the pattern.
$(x - 3)[x - (-5)] = 0$	Replace p with 3, q with –5.
$(x - 3)(x + 5) = 0$	Simplify.
$x^2 + 2x - 15 = 0$	Use FOIL.

The equation $x^2 + 2x - 15 = 0$ has roots 3 and –5.

b. $-\frac{7}{8}, \frac{1}{3}$

$x = -\frac{7}{8}, x = \frac{1}{3}$

$(x - p)(x - q) = 0$

$\left[x - \left(-\frac{7}{8}\right)\right]\left(x - \frac{1}{3}\right) = 0$

$\left(x + \frac{7}{8}\right)\left(x - \frac{1}{3}\right) = 0$

$x^2 - \frac{1}{3}x + \frac{7}{8}x - \left(\frac{7}{8}\right)\left(\frac{1}{3}\right) = 0$

$x^2 - \frac{3}{24}x + \frac{21}{24}x - \left(\frac{7}{24}\right) = 0$

$x^2 + \frac{18}{24}x - \frac{7}{24} = 0$

The equation $24x^2 + 13x - 7 = 0$ has roots $-\frac{7}{8}$ and $\frac{1}{3}$.

Write a quadratic equation in factored and standard form given the following root(s).

1. 3, –4

2. –8, –2

3. 1, 9

4. –5

5. 10, 7

6. –2, 15

7. $-\frac{1}{3}$, 5

8. 2, $\frac{2}{3}$

9. –7, $\frac{3}{4}$

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LT 3.5-3.6 Study Guide for Midterm

Solving Quadratic Equations by Factoring

Solve Equations by Factoring When you use factoring to solve a quadratic equation, you use the following property.

Zero Product Property	For any real numbers *a* and *b*, if *ab* = 0, then either *a* = 0 or *b* =0, or both *a* and *b* = 0.

Example: Solve each equation by factoring.

a. $3x^2 = 15x$

	2 terms (both with x's)
$3x^2 - 15x = 0$	Subtract 15*x* from both sides.
$3(x)(x) - 3(5)x = 0$	*Find GCF*
$3x(x - 5) = 0$	Factor (take out) GCF
$3x = 0$ or $x - 5 = 0$	Zero Product Property
$x = 0$ or $x = 5$	Solve each equation.

The solution: x = 0 and x = 5

b. $4x^2 - 5x = 21$

$4x^2 - 5x = 21$	Original equation
$4x^2 - 5x - 21 = 0$	Subtract 21 from both sides.
$(4x + 7)(x - 3) = 0$	Factor the trinomial.
$4x + 7 = 0$ or $x - 3 = 0$	Zero Product Property
$x = -\frac{7}{4}$ or $x = 3$	Solve each equation.

The solution: x = $-\frac{7}{4}$ and x = 3

Solve each equation by factoring.

1. $6x^2 - 2x = 0$

2. $x^2 = 7x$

3. $20x^2 = -25x$

7. $x^2 + x - 30 = 0$

9. $x^2 + 14x + 33 = 0$

15. $2x^2 - 250x + 5000 = 0$

8. $2x^2 - x - 3 = 0$

10. $4x^2 + 27x - 7 = 0$

11. $3x^2 + 29x - 10 = 0$

12. $6x^2 - 5x - 4 = 0$

13. $12x^2 - 8x + 1 = 0$

14. $5x^2 + 28x - 12 = 0$