

Notes: Solving Quadratic Equations by Factoring

Riddle:

"I am thinking of two numbers, a and b .
The product of my numbers is zero.
What do you know about my numbers?"

Oct 4-8:01 AM

Ex. 1: Solve for x .

a. $x(x - 4) = 0$

b. $(x - 4)(2x + 5) = 0$

Oct 4-8:04 AM

1-Solving by Factoring Outline.notebook

Ex. 2: Solve by factoring.

a. $m^2 - 10m = 0$

b. $9x^2 = 49$

Oct 4-8:04 AM

c. $y^2 + 6y = 0$

b. $4b^2 - 8b - 5 = 0$

Oct 4-8:04 AM

Solving Quadratic Equations By Factoring

Solve each equation by factoring.

1) $(3n - 2)(4n + 1) = 0$

2) $m(m - 3) = 0$

3) $(5n - 1)(n + 1) = 0$

4) $(n + 2)(2n + 5) = 0$

5) $3k^2 + 72 = 33k$

6) $n^2 = -18 - 9n$

7) $7v^2 - 42 = -35v$

8) $k^2 = -4k - 4$

9) $-2v^2 - v + 12 = -3v^2 + 6v$

10) $-4n^2 + 6n - 16 = -5n^2$

$$11) 8r^2 + 3r + 2 = 7r^2$$

$$12) b^2 + b = 2$$

$$13) 10n^2 - 35 = 65n$$

$$14) 3x^2 - 8x = 16$$

$$15) 16n^2 - 114n = -14$$

$$16) 28n^2 = -96 - 184n$$

$$17) 7a^2 + 32 = 7 - 40a$$

$$18) 42x^2 - 69x + 20 = 7x^2 - 8$$

Critical thinking questions. True/False.

19) If a quadratic equation can be factored and each factor contains only real numbers then there cannot be an imaginary solution.

20) If a quadratic equation cannot be factored then it will have at least one imaginary solution.

Notes: Solving Quadratic Equations using Square Roots

Ex. 1: Solve using two methods.

$$x^2 - 7 = 9$$

FACTORIZING: USING SQUARE ROOTS:

Oct 4-8:12 AM

Ex. 2: Solve using square roots.

a. $4r^2 - 7 = 9$

b. $36x^2 = 121$

Oct 4-8:15 AM

$$c. 7x^2 - 8 = 13$$

$$d. 4z^2 + 7 = 12$$

Oct 4-8:15 AM

Ex. 3: Solve using square roots.

$$a. (x + 2)^2 = 10$$

$$b. 2(x - 3)^2 = 18$$

Oct 4-8:15 AM

Solving Quadratic Equations

By Factoring & Using Square Roots WS 2

Solve each equation or find the zeros of the function by factoring or using square roots.

1. $10x^2 - 5x = 0$

2. $81x^2 - 16 = 0$

3. $3(x+1)^2 - 9 = 0$

4. $6x^2 = 23x - 7$

5. $2(x-3)^2 - 40 = 0$

6. $9x(x-7) - 4(x-7) = 0$

7. $f(x) = \frac{5}{2}x^2 - 10$

8. $f(x) = 21x - 3x^2$

9. $f(x) = 6x^2 + 15x - 36$

10. $f(x) = 8\left(x - \frac{1}{2}\right)^2 - 2$

11. $f(x) = 16x^2 - 5$

12. $f(x) = 2x^3 - x^2 - 10x + 5$

Solving Quadratic Equations

By Factoring & Using Square Roots

Solve each equation or find the zeros of the function by factoring or using square roots.

1. $6x^2 = 14x$

2. $x^2 - 16 = 0$

3. $2(x+4)^2 - 10 = 0$

4. $x^2 + 8x + 15 = 0$

5. $4(x-1)^2 - 100 = 0$

6. $9x(x-7) - 4(x-7) = 0$

7. $2x^2 = 5x + 3$

8. $(x+6)^2 - 40 = 0$

9. $\frac{1}{4}(x+3)^2 - 1 = 0$

10. $f(x) = \frac{2}{3}x^2 - 12$

11. $f(x) = 16x - 24$

12. $f(x) = 10x^2 + 25x - 60$

13. $f(x) = 4x^2 - 1$

14. $f(x) = 16x^2 - 9$

15. $f(x) = 5x(2x-1) + 3(2x-1)$

16. $f(x) = 21x - 3x^2$

17. $f(x) = 4\left(x - \frac{7}{2}\right)^2 - 1$

18. $f(x) = 5x^2 - 14x + 8$

Solving Quadratic Equations by Completing the Square

Example 1:

Which trinomial is a perfect square trinomial? Explain.

$x^2 - 8x + 10$

$x^2 + 8x - 16$

$x^2 + 8x + 16$

Example 2:

Find the value of "c" that makes each trinomial a perfect square trinomial. Then write the expression as the square of a binomial.

a. $x^2 + 12x + c$

b. $x^2 - 24x + c$

c. $x^2 + 5x + c$

Example 3:

Solve each equation by completing the square.

a. $x^2 - 10x + 13 = 0$

b. $x^2 - 8x + 7 = 0$

Example 3:

Solve each equation by completing the square.

c. $3x^2 - 12x + 27 = 0$

d. $2x^2 - 20x + 24 = 0$

Solving Equations by Completing the Square

Solve each equation by completing the square.

1) $a^2 + 2a - 3 = 0$

2) $a^2 - 2a - 8 = 0$

3) $p^2 + 16p - 22 = 0$

4) $k^2 + 8k + 12 = 0$

5) $r^2 + 2r - 33 = 0$

6) $a^2 - 2a - 48 = 0$

7) $m^2 - 12m + 26 = 0$

8) $x^2 + 12x + 20 = 0$

9) $k^2 - 8k - 48 = 0$

10) $p^2 + 2p - 63 = 0$

11) $m^2 + 2m - 48 = -6$

12) $p^2 - 8p + 21 = 6$

Solving Quadratic Equations By Completing the Square Date _____ Period _____

Solve each equation by completing the square.

1) $p^2 + 14p - 38 = 0$

2) $v^2 + 6v - 59 = 0$

3) $a^2 + 14a - 51 = 0$

4) $x^2 - 12x + 11 = 0$

5) $x^2 + 6x + 8 = 0$

6) $n^2 - 2n - 3 = 0$

7) $x^2 + 14x - 15 = 0$

8) $k^2 - 12k + 23 = 0$

9) $r^2 - 4r - 91 = 7$

10) $x^2 - 10x + 26 = 8$

11) $k^2 - 4k + 1 = -5$

12) $b^2 + 2b = -20$

Quadratic Equation

$$ax^2 + bx + c = 0$$

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The discriminant: _____

Find the value of the discriminant for each quadratic equation.

Do you see a relationship between the number of x-intercepts and the discriminant?

Equation	# of x-intercepts	Value of the discriminant	Graph
1. $f(x) = x^2 + 6x + 2$			
2. $f(x) = 2x^2 - 6x + 5$			
3. $f(x) = x^2 - 4x + 4$			
4. $f(x) = x^2 + 6x + 9$			
5. $f(x) = 3x^2 + 4x + 1$			
6. $f(x) = x^2 + 5x + 7$			

What does the value of the discriminant tell us?

Graph	Value of the Discriminant	Nature of the Roots
Crosses x-axis twice (2 x-intercepts)		
Touches the x-axis once (1 x-intercept)		
Never crosses the x-axis (0 x-intercepts)		

Let's Practice!

1. $4x^2 + 7x + 3 = 0$

Value of the discriminant _____

Nature of the Roots _____

Touches or crosses x-axis and how many times? _____

2. $-2x^2 - 5x = 10$

Value of the discriminant _____

Nature of the Roots _____

Touches or crosses x-axis and how many times? _____

3. $-8x = -4x^2 - 4$

Value of the discriminant _____

Nature of the Roots _____

Touches or crosses x-axis and how many times? _____

Find the discriminant of each of the quadratic equations. Remember, you must set your equation equal to zero first!

1. $2x^2 - 5x = 8$

- a. Find the discriminant

- b. Based on that number, how many solutions will you have?

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

- a. Find the discriminant

- b. Based on that number, how many solutions will you have?

3. $a^2 - 2a - 1 = 0$

- a. Find the discriminant

- b. Based on that number, how many solutions will you have?

4. $3v^2 = -11v + 4$

- a. Find the discriminant

- b. Based on that number, how many solutions will you have?

5. $7x^2 + 2 = 2x$

- a. Find the discriminant

- b. Based on that number, how many solutions will you have?

Using the Quadratic Formula

Solve each equation with the quadratic formula.

1) $m^2 - 5m - 14 = 0$

2) $b^2 - 4b + 4 = 0$

3) $2m^2 + 2m - 12 = 0$

4) $2x^2 - 3x - 5 = 0$

5) $x^2 + 4x + 3 = 0$

6) $2x^2 + 3x - 20 = 0$

7) $4b^2 + 8b + 7 = 4$

8) $2m^2 - 7m - 13 = -10$

$$9) 2x^2 - 3x - 15 = 5$$

$$10) x^2 + 2x - 1 = 2$$

$$11) 2k^2 + 9k = -7$$

$$12) 5r^2 = 80$$

$$13) 2x^2 - 36 = x$$

$$14) 5x^2 + 9x = -4$$

$$15) k^2 - 31 - 2k = -6 - 3k^2 - 2k$$

$$16) 9n^2 = 4 + 7n$$

$$17) 8n^2 + 4n - 16 = -n^2$$

$$18) 8n^2 + 7n - 15 = -7$$

