

Geometry

Unit 2B: Solving Quadratic Equations

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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

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

e. $x^2 + 2x = 63$

f. $-3r^2 = 7r + 4$

Oct 4-8:04 AM

* $(x - 6)(x + 2) = 48$

Oct 4-8:04 AM

Ex. 3: Find the zeros of the function.

a. $f(x) = x^2 - 4x - 21$

b. $g(x) = 9x^2 - 4$

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.

AC Math 1
Solving by Factoring WS

Name _____

Solve the equation.

1. $(x+8)(x+6)=0$

6. $x^2+7x-18=0$

2. $x(x-5)=0$

7. $x^2+11x+18=0$

3. $(2x+5)(x-3)=0$

8. $x^2-49=0$

4. $2x(3x-2)=0$

9. $2x^2-2x-4=0$

5. $\left(\frac{1}{3}-3x\right)\left(\frac{1}{5}+2x\right)=0$

10. $x^2+10x+25=0$

$$11. x^2 - x = 42$$

$$17. 6m^2 - 33m + 15 = 0$$

$$12. x^2 - 2x = 63$$

$$18. 3a^2 + 1 = 4a$$

$$13. x^2 - 48 = -2x$$

$$19. 9y^2 = 18y + 16$$

$$14. x^2 = 2x - 1$$

$$20. m(3m + 1) = 2$$

$$15. 2y^2 + 9y = -10$$

$$21. y(y - 5) = 14$$

$$16. 7m^2 = 8m$$

$$22. b(b + 9) = 4(5 + 2b)$$

Solving Quadratic Equations by Completing the Square

Example 1:

Which trinomial is a perfect square trinomial? Explain.

$$x^2 - 8x + 10 \quad x^2 + 8x - 16 \quad x^2 + 8x + 16$$

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.

$$\text{a. } x^2 + 12x + c \quad \text{b. } x^2 - 24x + c \quad \text{c. } x^2 + 5x + c$$

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

$$13) v^2 - 6v = -91$$

$$14) n^2 = 18n + 40$$

$$15) 5k^2 = 60 - 20k$$

$$16) 6x^2 - 48 = -12x$$

$$17) 8x^2 + 16x = 42$$

$$18) 9n^2 + 79 = -18n$$

$$19) 2a^2 = -6 + 8a$$

$$20) 2x^2 - 5x + 67 = 0$$

$$21) 4n^2 + 4n + 36 = 0$$

$$22) 7k^2 - 16k + 100 = 0$$

$$23) 10p^2 + 4p + 77 = 0$$

$$24) 3x^2 = -4 + 8x$$

Notes: Solving Quadratic Equations using Square Roots

Ex. 1: Solve using two methods.

$$x^2 - 7 = 9$$

FACTORING: 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

AC Math 1
Solving Quadratic Equations
By Factoring & Using Square Roots

Name _____

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

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

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

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

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

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

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

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

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

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

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

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

Using the Quadratic Formula

Solve each equation with the quadratic formula.

1) $v^2 + 2v - 8 = 0$

2) $k^2 + 5k - 6 = 0$

3) $2v^2 - 5v + 3 = 0$

4) $2a^2 - a - 13 = 2$

5) $2n^2 - n - 4 = 2$

6) $b^2 - 4b - 14 = -2$

7) $8n^2 - 4n = 18$

8) $8a^2 + 6a = -5$

9) $10x^2 + 9 = x$

10) $n^2 = 9n - 20$

11) $3a^2 = 6a - 3$

12) $x^2 = -3x + 40$

13) $9x^2 - 11 = 6x$

14) $4a^2 - 8 = a$

15) $14m^2 + 1 = 6m^2 + 7m$

16) $4x^2 + 4x - 8 = 1$