

## 11.5 Solve Quadratic Equations by Factoring

## NOTES

Write your  
questions here!



Steps for factoring *(No Equal Sign)*

### Step 1

- Write the expression in Standard Form

### Step 2

- Check to see if there is a greatest common factor (GCF) you can take out of each term.

### Step 3

- Decide if its a binomial or trinomial

### Step 4

- Use the "Difference of Squares" or the "Guess & Check" method depending on the number of terms the polynomial has.

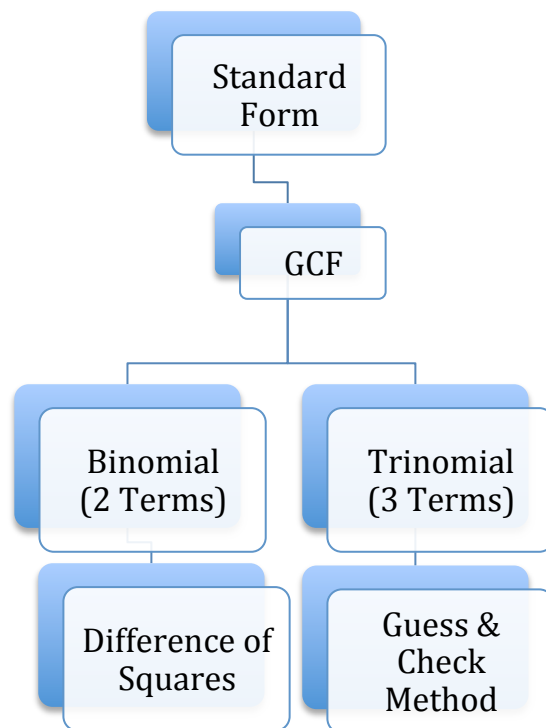
**Ex 1.**  $8x - 32x^2 + 60$

**Ex 2.**  $75x^3 - 12x$

**Ex 3.**

**Factor:**  $12x^2 - 31x - 30$ .

A value:	B value:	C value:
<input type="text"/>	<input type="text"/>	<input type="text"/>
factor pairs:		factor pairs:



**Step 1:** Find the values of "A", "B", and "C."

**Step 2:** List all the factor pairs "A" and "C."

Write your  
questions here!



## Steps for Solving Quadratic Equations (*Equal Sign*)

### Step 1

- Write the equation in Standard Form with zero on one side.

### Step 2

- Check to see if there is a greatest common factor (GCF) you can take out of each term.

### Step 3

- Decide if its a binomial or trinomial

### Step 4

- Use the "Difference of Squares" or the "Guess & Check" method depending on the number of terms the polynomial has.

### Step 5

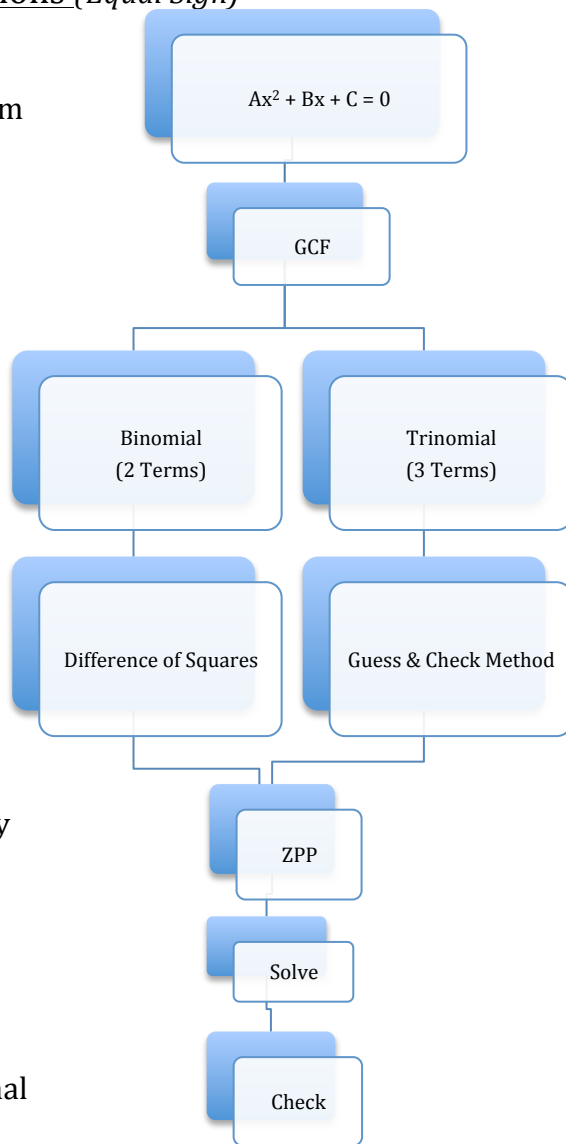
- Apply the Zero-Product Property by setting each factor equal to zero

### Step 6

- Solve for the variable

### Step 7

- Check your solution(s) in the original equation



**Ex 4.**  $3y^2 + 22y + 60 = -14y - 48$

- Ex 5.** You have a rectangular vegetable garden in your backyard that measures 15 feet by 10 feet. You want to double the area of the garden by adding the same distance  $x$  to the length and width of the garden. Find the value of  $x$  and the new dimensions of the garden.

Write your  
questions here!



**Ex 6.** You are designing a garden for the school plot. You want the garden to be made up of a rectangular flower bed surrounded by a boarder of uniform width, which will be covered with decorative stones. You have decided that the flower bed will be 22 feet by 15 feet, and your budget will allow for enough stone to cover 120 square feet. What should the width of the border be?

Summary:

Now,  
mmarize  
our notes  
here!



## 11.5 Solve Quadratic Equations by Factoring

## PRACTICE

*Factor out -1 and then factor further.*

1.  $-x^2 - 4x + 21$

2.  $36 - 9a - a^2$

3.  $32 + 4x - x^2$

*Factor out a negative common factor first and then factor further if possible.*

4.  $-8x^2 + 6x + 9$

5.  $90 + 45x - 10x^2$

6.  $-18x^3 - 51x^2 + 9x$

**Factor the expression completely.**

7.  $12x^2 - 4x - 40$

8.  $18z^2 + 36z + 16$

9.  $32v^2 - 2$

10.  $6u^2 - 24u$

11.  $12m^2 - 36m + 27$

12.  $20x^2 + 124x + 24$

13.  $21x^2 - 77x - 28$

14.  $-8y^2 + 28y - 60$

15.  $-36n^2 + 48n - 15$

16.  $2x^3 - 5x^2 + 3x$

17.  $4x - 9x^3$

18.  $8x^4 - 8x^3 - 6x^2$

**Factor trinomials with larger coefficients.**

19.  $14x^2 + 41x + 15$

20.  $55b^2 - 205x - 60$

21.  $35y^3 - 230y^2 - 105y$

22.  $-125m^2 + 50x^3 + 120x^4$

**Short Answer**

23. What is the difference between a quadratic and a linear equation?

**Solve the quadratic equation, if possible.**

24.  $x^2 - 8x + 12 = 0$

25.  $x^2 - 11x + 30 = 0$

26.  $x^2 + 2x - 35 = 0$

27.  $a^2 - 49 = 0$

28.  $b^2 - 6b + 9 = 0$

29.  $c^2 + 5c + 4 = 0$

30.  $n^2 - 6n = 0$

31.  $w^2 - 16w + 48 = 0$

32.  $t^2 + 10t + 25 = 0$

33.  $z^2 - 3z = 54$

34.  $u^2 = -9u$

35.  $6r^2 - 7r - 5 = 0$

36.  $14x - 49 = x^2$

37.  $r^2 + 2r = 80$

38.  $m^2 = 7m$

39.  $16x^2 - 1 = 0$

40.  $-3y + 28 = y^2$

41.  $14s^2 - 21s = 0$

42.  $11q^2 - 44 = 0$

43.  $4x^2 - 20x + 25 = 0$

44.  $45n^2 + 10n = 0$

45.  $15x^2 + 7x - 2 = 0$

46.  $4p^2 + 12p + 9 = 0$

47.  $36z^2 + 96z + 15 = 0$

**Are there real number solutions to the quadratic equations below? Explain why or why not.**

48.  $x^2 + 25 = 0$

**Solve the equation.**

49.  $2x^2 - 4x - 8 = -x^2 + x$

50.  $24x^2 + 8x + 2 = 5 - 6x$

51.  $18x^2 - 22x = 28$

52.  $13x^2 + 21x = -5x^2 + 22$

53.  $x = 4x^2 - 15x$

54.  $(x+8)^2 = 16 - x^2 + 9x$

**In problems 55 - 57, describe and correct the error in solving the equation.**

55.  
 $x^2 - x - 6 = 0$   
 $(x-2)(x+3) = 0$  **X**  
 $x-2 = 0$  or  $x+3 = 0$   
 $x = 2$  or  $x = -3$

56.  
 $x^2 + 7x + 6 = 14$   
 $(x+6)(x+1) = 14$  **X**  
 $x+6 = 14$  or  $x+1 = 14$   
 $x = 8$  or  $x = 13$

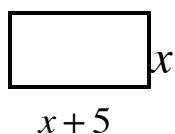
57.  
 $4x^2 - 36 = 4(x^2 - 36)$   
 $= 4(x+6)(x-6)$  **X**  
 $x+6 = 0$  or  $x+1 = 0$   
 $x = -6$  or  $x = -1$

**Who is correct? Explain why.**

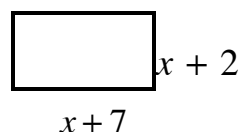
<p>58. <b>Jimmy</b></p> $-21 - 34x + 8x^2 = 0$ $8x^2 - 34x - 21 = 0$ $(2x-7)(4x-3) = 0$ $x = \frac{7}{2} \quad x = \frac{3}{4}$	<p><b>or</b></p>	<p><b>Johnny?</b></p> $-21 - 34x + 8x^2 = 0$ $8x^2 - 34x - 21 = 0$ <p>Not factorable.</p> <p>No real solutions</p>
---	------------------	--

**GEOMETRY: Find the value of x.**

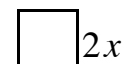
59. Area of a rectangle = 36

  
 $x$   
 $x+5$

60. Area of a rectangle = 84

  
 $x+2$   
 $x+7$

61. Area of a square = 36

  
 $2x$

**Write an equation that you can solve to find the value of  $x$ .**

62. A rectangular picnic site measures 24 feet by 10 feet. You want to double the site's area by adding the same distance  $x$  to the length and the width.

63. A rectangular deck for a recreational center is 21 feet long by 20 feet wide. Its area is to be halved by subtracting the same distance  $x$  from the length and the width. Write and solve an equation to find the value of  $x$ . What are the deck's new dimensions?

64. A rectangular performing platform in a park measures 10 feet by 12 feet. You want to triple the platform's area by adding the same distance  $x$  to the length and the width.

65. You have a rectangular stained glass window that measures 2 feet by 1 foot. You have 4 square feet of glass which to make a border of uniform width around the window. What should the width of the window be?

66. The Smiths' have decided to put a paved walkway of uniform width around their swimming pool. The pool is a rectangular pool that measures 12 feet by 20 feet. The area of the walkway will be 68 square feet. Find the width of the walkway.

## 11.5 Solve Quadratic Equations by Factoring

## APPLICATION

Solve the system of equations using the substitution method. Check your solutions.

1.  $y = 3x^2 + 4x - 7$   
 $y = 2x + 1$

2.  $y = 2x^2 + 3x - 4$   
 $y = 6x + 5$

Find two distinct integers  $c$  such that the given expression can be factored. Then verify your answers by factoring.

3.  $3x^2 - 10x + c$

4.  $2x^2 + 5x + c$

5. Solve:  $11x^3 - 3x^2 = 5x^3 - 3x + 6x^2$