# 11.6 Factor by Grouping & What Solutions Mean Graphically

NOTES

Write your questions here!

## Steps for factoring *(No Equal Sign)*

**Step 1**

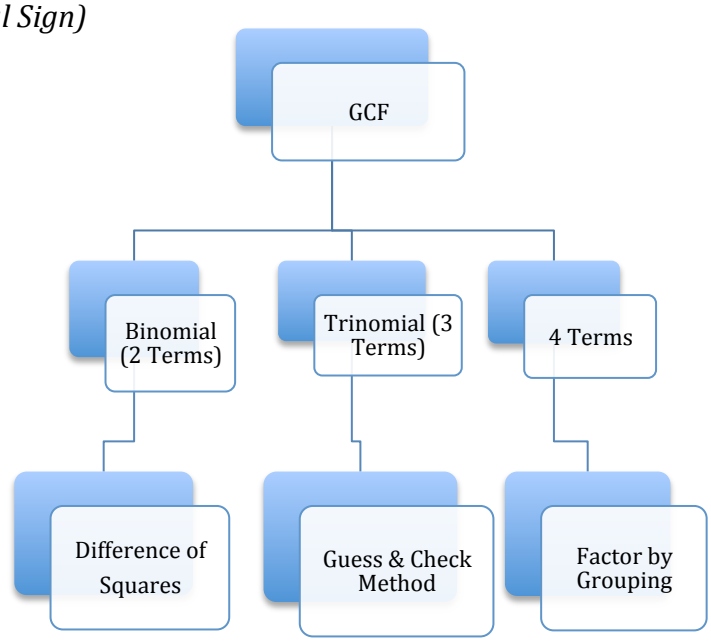
- Check to see if there is a greatest common factor you can take out of each term.

**Step 2**

- Decide if its a binomial, Trinomial, or a polynomial with 4 terms

**Step 3**

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




### Factor by Grouping

1. $x^3-2x^2+4x-8$

3. $8x^3+20x^2-2x-5$

4. $6x^3-7x^2+6x-7$

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, or a polynomial with 4 terms

**Step 4**

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

**Step 5**

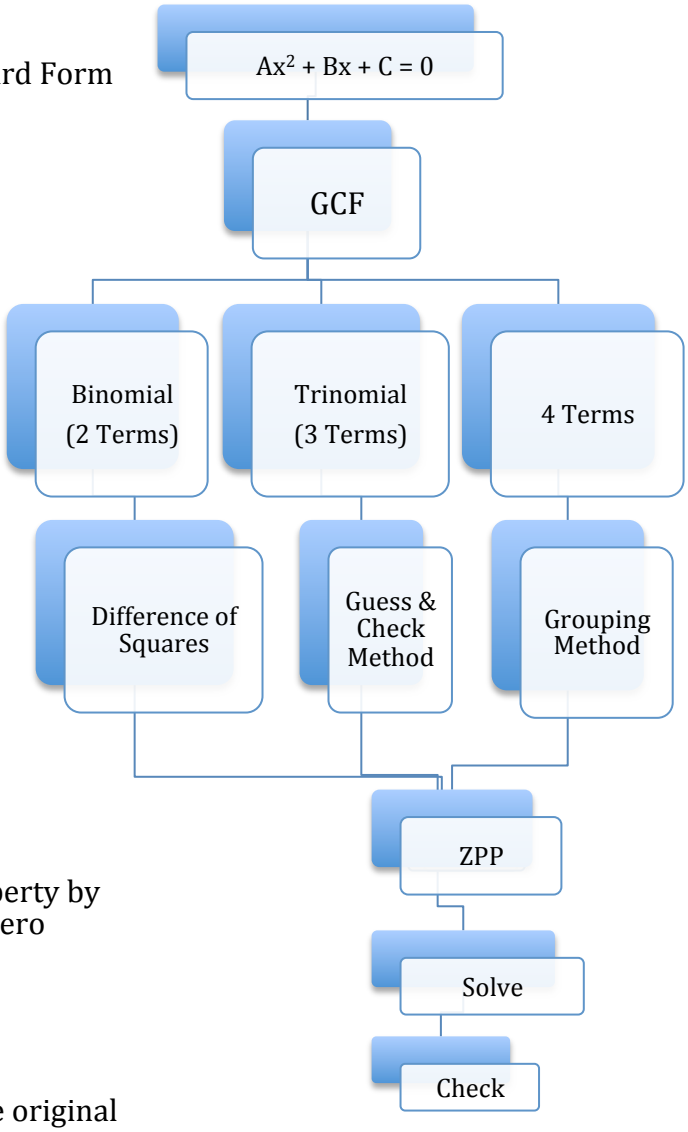
- Apply the Zero-Product Property by setting each factor equal to zero

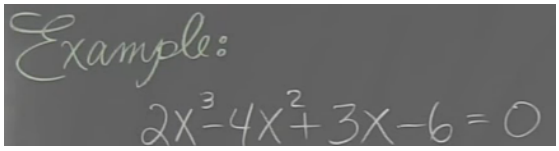
**Step 6**

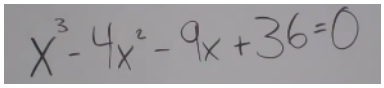
- Solve for the variable

**Step 7**

- Check your solution(s) in the original equation




2. 

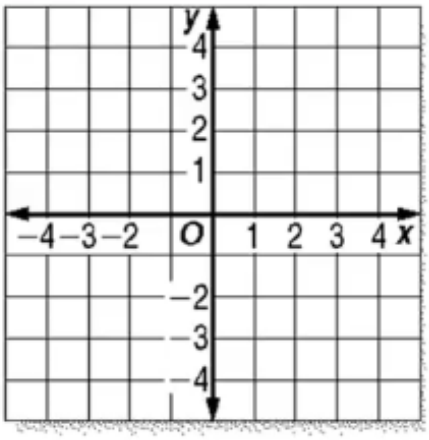

5. 

Write your questions here!

**Ex 6.**

$f(x) = x^2 + 3x - 1$

| $x$ | $y$ |
|---|---|




**Summary:**

Now, summarize your notes here!

## 11.6 Factor by Grouping & What Solutions Mean Graphically

**PRACTICE**

**Factor Completely.**

| | | |
|---|---|---|
| 1. $12x^3 + 2x^2 - 30x - 5$ | 2. $56n^3 + 64n^2 + 70n + 80$ | 3. $6b^3 + 16b^2 - 15b - 40$ |
| 4. $70n^4 + 40n^3 + 28n^2 + 16n$ | 5. $126r^5 - 144r^4 - 210r^3 + 240r^2$ | 6. $8r^3 - 64r^2 + r - 8$ |

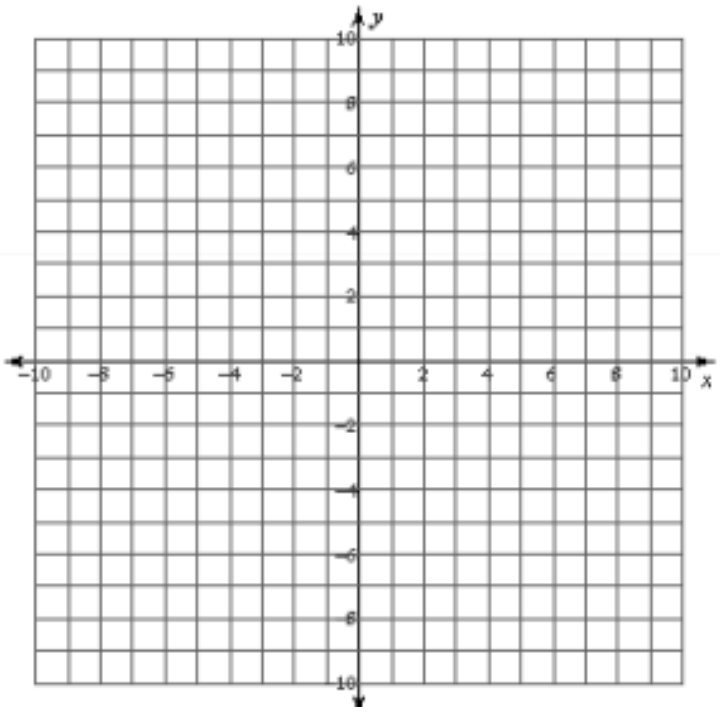
| Solve the following polynomial equations. | | |
|---|---|---|
| 7. $x^3 - x^2 - 3x + 3 = 0$ | 8. $x^4 + 2x^3 - 5x^2 - 10x = 0$ | 9. $x^6 - 2x^4 - x^2 + 2 = 0$ |
| 10. $4b^3 + b^2 + 8b + 2 = 0$ | 11. $3t^3 + 15t^2 + t + 3 = 0$ | 12. $x^3 - 3x^2 - 16x + 48 = 0$ |

**13. Graphing Quadratic Equations**

Use the function $f(x) = x^2 + 2x - 8$ to answer the following.

a) Complete the table. Plot points on the graph.

| X | $f(x) = x^2 + 2x - 8$ | F(x) | (x,y) |
|---|---|---|---|
| -5 | | | |
| -3 | | | |
| -2 | | | |
| -1 | | | |
| 0 | | | |
| 1 | | | |
| 3 | | | |




b) Put the function into factored form.

c) What shape does the graph make?

d) How do the zeroes relate to the graph?

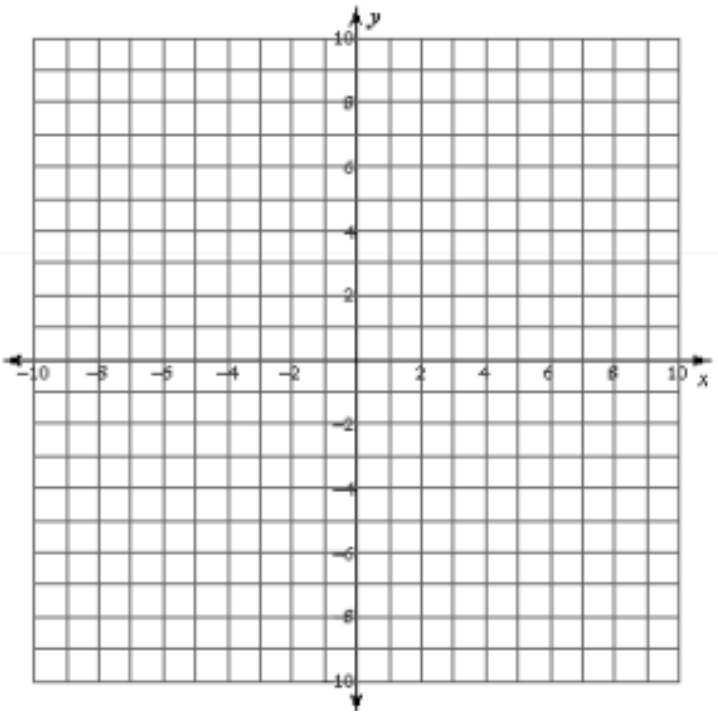
e) How do the zeroes relate to the graph?

## 14. Graphing Polynomial Equations

Use the function $f(x) = x^3 + 2x^2 - 3x$ to answer the following.

b) Complete the table. Plot points on the graph.

| X | $f(x) = x^3 + 2x^2 - 3x$ | F(x) | (x,y) |
|---|---|---|---|
| -3.5 | | | |
| -3 | | | |
| -2 | | | |
| -1 | | | |
| 0 | | | |
| 0.5 | | | |
| 1 | | | |
| 2 | | | |




b) Put the function into factored form.

c) What shape does the graph make?

d) How do the zeroes relate to the graph?

| **Find the zeros of the function by rewriting the function in intercept form.** | | |
|---|---|---|
| 10) $y = x^2 + 6x + 8$ | 11) $f(x) = x^2 - 4x - 32$ | 12) $f(x) = x^2 + 11x$ |
| 13) $g(x) = x^2 + 19x + 84$ | 14) $y = x^2 - 64$ | 15) $y = 4x^2 - 19x - 5$ |
| 16) $y = 11x^2 - 19x - 6$ | 17) $y = 18x^2 - 6x - 4$ | 18) $f(x) = 4x^2 + 28x + 49$ |

| | | |
|---|---|---|
| 19) $y(x)=15x^2-5x-20$ | 20) $y=x^2+22x+121$ | 21) $g(x)=2x^3-x^2+4x-2$ |

| | |
|---|---|
| 22)What are the roots of the equation $2x^4+4x^3-126x^2=0$ | 23)What are the zeros of $f(x)=12x^3-4x^2-75x+25$ ? |

## **11.6** Factor by Grouping & What Solutions Mean

**APPLICATION**

1. Write a quadratic equation of the form $x^2+bx+c=0$ that has roots 8 and 11.

2. For what integers $b$ can the expression $x^2+bx+7$ be factored? *Explain.*

3. **Projectile Application**

Directions: A projectile is an object that is propelled into the air, but has no power to keep itself in the air, like a thrown ball. The height of a projectile can be described by the vertical motion model:

$s(t) = -16t^2 + vt + h$, where **s(t)** represents the height of the projectile, ***t*** represents the time in seconds the object has been in the air, ***v*** is the initial velocity (in feet per second) and ***h*** is the initial height(in feet).

3) A cliff diver jumps from a ledge 96 feet above the ocean with an initial upward velocity of 16 feet per second.

a) Write an equation that represents this situation.

b) How long will it take until the diver enters the water? (Hint: You should factor out a GCF first).

c) How high above the water will the projectile be in 2 seconds?