

# Algebra 1 Week 6 Notes

## Review: Solve Using the Given Method

### Ex 1: Solve Using Factoring

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

$$10 \cdot -3 = -30$$

$$10 + -3 = 7$$

$$(x+10)(x-3) = 0$$

$$\begin{array}{l|l} x+10=0 & x-3=0 \\ -10 & +3 \\ -10 & +3 \end{array}$$

$$x = -10$$

$$x = 3$$

### Remember

- 1) What multiplies to  $-30$  and adds to  $7$
- 2) Write as two binomials in  $( )$
- 3) Solve each  $( )$  by setting  $=$  to zero!

### Ex 2: Solve Using Square Roots

$$-3(x+1)^2 + 7 = -20$$

$$\begin{array}{l} -7 & -7 \end{array}$$

$$\frac{-3(x+1)^2}{-3} = \frac{-27}{-3}$$

$$\sqrt{(x+1)^2} = \sqrt{9}$$

$$\begin{array}{l} x+1=3 \\ -1 & -1 \end{array}$$

$$\begin{array}{l} x+1=-3 \\ -1 & -1 \end{array}$$

$$x = 2$$

$$x = -4$$

### Remember

1. Get  $( )^2$  by itself!
2.  $\sqrt{\quad}$  each side
3. Solve both equations!

Example 3: Solve by completing the square

$$x^2 + 12x = 6$$

$$\frac{12}{2} = 6 \rightarrow 6^2 = 36$$

$$x^2 + 12x + 36 = 36 + 6$$

↓

$$(x+6)^2 = 42$$

$$\sqrt{(x+6)^2} = \sqrt{42} \leftarrow \text{can leave as is!}$$

$$\begin{array}{r} x+6 = \sqrt{42} \\ -6 \quad -6 \\ \hline \end{array}$$

$$\begin{array}{r} x+6 = -\sqrt{42} \\ -6 \quad -6 \\ \hline \end{array}$$

$$x = -6 + \sqrt{42}$$

$$x = -6 - \sqrt{42}$$

$$x = -6 \pm \sqrt{42}$$

OR, with calculator

$$x = .48$$

$$x = -12.48$$

Remember

- 1) Complete the square by dividing 'b' (the middle) by 2 and squaring it.
- 2) Add that number to both sides
- 3) Factor the left side!
- 4) Solve by  $\sqrt{\quad}$ -ing both sides

# Example 4: Solve using the Quadratic Formula

$$3x^2 - 4x = 7$$

$$\underline{3x^2 - 4x - 7 = 0}$$

$$a=3 \quad b=-4 \quad c=-7$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(3)(-7)}}{2(3)}$$

$$x = \frac{4 \pm \sqrt{16 + 84}}{6}$$

$$x = \frac{4 \pm \sqrt{100}}{6}$$

$$x = \frac{4 \pm 10}{6}$$

+

$$x = \frac{4+10}{6} = \frac{14}{6} \text{ OR } \frac{7}{3}$$

-

$$x = \frac{4-10}{6} = -\frac{6}{6} \text{ OR } -1$$

## Remember

1) Rewrite as

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

2) Find  $a$ ,  $b$ , and  $c$

3) 
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

4) Simplify the  $\sqrt{\quad}$

5) Split into 2 and solve!

# How do I pick a solving method?

We have learned to solve using:

- Square roots
- completing the square
- factoring
- the quadratic formula

You can solve a lot of quadratic equations using more than one method!

But how do I pick one???

Square Roots	Use <u>only</u> if you can get $x^2$ OR $(x \pm \text{---})^2$ by itself
Factoring	Use when given $x^2 + bx + c = 0$ and you can find two numbers that <u>multiply</u> to $c$ and <u>add</u> to $b$
Completing the Square	Use when given $ax^2 + bx + c = 0$ and $b$ is <u>even</u>
Quadratic Formula	Works for all equations $ax^2 + bx + c = 0$

Remember: You can always factor out a GCF OR rewrite the equation.

Example 5:  $x^2 - 5x + 4 = 0$

I'm using this because it's faster

$$\begin{aligned} -4 \cdot -1 &= 4 \\ -4 + -1 &= -5 \quad \checkmark \end{aligned}$$

$$(x-4)(x-1) = 0$$

$$\boxed{x=4} \quad | \quad \boxed{x=1}$$

Can Use

- factoring OR
- quadratic formula

Example 6:  $x^2 + 10x = -15$

Using this because I try to avoid the quad. formula

$$\frac{10}{2} = 5 \rightarrow 5^2 = \underline{25}$$

Can use

- completing the square OR
- quadratic formula

$$x^2 + 10x + 25 = -15 + 25$$

$$\sqrt{(x+5)^2} = \sqrt{10}$$

$$\begin{array}{l} x+5 = \sqrt{10} \\ \underline{-5 \quad -5} \end{array} \quad \begin{array}{l} x+5 = -\sqrt{10} \\ \underline{-5 \quad -5} \end{array}$$

$$x = -5 + \sqrt{10} \quad x = -5 - \sqrt{10}$$

$$\boxed{x = -5 \pm \sqrt{10}}$$

### Example 7:

A football player throws a football across the field. The path of the football can be modeled by the function  $f(x) = -x^2 + 6x$  where  $f(x)$  is height in yards and  $x$  is seconds. How long until the ball hits the ground?

When the ball hits the ground,  $f(x) = 0$

so,

$$0 = -x^2 + 6x \quad \text{Factor out a GCF}$$

$$0 = x(-x + 6)$$

$$\begin{array}{l|l} x=0 & -x+6=0 \\ & \underline{-6 \quad -6} \\ & -x = -6 \quad \text{so } x=6 \end{array}$$

$x=0$  is the start time,

$x=6$  seconds is the end time

To turn in your work:

Mr. Briggs, Mr. Murnane - send a photo to email

Mrs. Dua, Mr. Dewitt, Ms. Smith - send a photo to email or remind

Ms. Reyburn - send a photo to email, remind, or teacher instagram

Mrs. Burke, send a photo to email, remind, or padlet

*Solve using factoring.*

1.  $x^2 + 10x + 24 = 0$

*Solve using completing the square.*

3.  $x^2 + 6x = 12$

*Solve using square roots.*

2.  $10(x - 3)^2 - 1 = 39$

*Solve using the quadratic formula.*

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

*Solve using any method!*

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

6.  $x^2 + 10x = -15$

7.  $(2x + 3)^2 = 9$

8. The freshmen in living earth launch homemade rockets at the start of the school year. One team's rocket had a flight path modeled by the equation  $h(x) = -x^2 + 4x$  where  $x$  is time in seconds and  $h(x)$  is height in yards. How long does it take for the rocket to hit the ground?

# Answer Bank

$x = -3 \pm \sqrt{21}$	$x = \frac{-2 \pm \sqrt{52}}{6}$ OR $x = -1.54$ and $x = .87$	4 seconds	$x = -5 \pm \sqrt{10}$ OR $x = \frac{-10 \pm \sqrt{40}}{2}$
$x = -3$ $x = 0$	$x = 1$ $x = 5$	$x = -6$ $x = -4$	$x = -8$ $x = 1$



## Solving Quadratic Equations using Zero Product Property

Algebra 1 – Distance Learning Check-In  
Freedom High School

Student \_\_\_\_\_  
Period \_\_\_\_\_ Teacher \_\_\_\_\_

DIRECTIONS: Complete online using [LHUSD Testing portal](#) located on the Freedom High School Website under Short Cuts, or in the Algebra 1 folder of the Online/Distance Learning Folder under math.  
•• If you do NOT have internet access, print and email your paper to your work teacher turn in.

STUDENT ID: ###-####

Access Code: **2SXPWSB**

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1. **What are the solutions for  $x$  for the quadratic equation  $(2x - 1)(x + 4) = 0$  ?**  
**CHOOSE ALL THAT APPLY**

- A)  $x = 0$                       B)  $x = \frac{1}{2}$                       C)  $x = -\frac{1}{2}$                       D)  $x = -2$   
E)  $x = 2$                         F)  $x = 4$                         G)  $x = -4$                       H) *No Real Solutions*

Use the quadratic equation below to answer the following questions.

$$x^2 - 3x - 40 = 0$$

*If you factor the quadratic equation into 2 binomials, what are the 2 binomials?*

2. (      )

3. (      )

4. **What are the solutions for  $x$  for the quadratic equation?**  
**CHOOSE ALL THAT APPLY**

- A)  $x = 0$                       B)  $x = 5$                       C)  $x = -5$                       D)  $x = 8$   
E)  $x = -8$                       F)  $x = \frac{40}{3}$                       G)  $\frac{3}{40}$                       H) *No Real Solutions*
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Please be honest in answering the next questions. You earn the same points no matter the answer.

5. I did the assessment

- A) By myself w/o any help or notes from anyone.  
B) Using notes, but no one helped me.  
C) I did most problems by myself  
D) I needed help solving the quadratic.  
E) I did my best, but I did NOT want to ask anyone to help.  
F) I did my best, but no one was available to help me.