

# Ch. 9 Review Guide Algebra

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Simplify the following Radicals

1.  $\sqrt{24}$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 3}$   
 $2 \cdot \sqrt{6}$

2.  $-\sqrt{80}$

$-1 \cdot \sqrt{4 \cdot 4 \cdot 5}$   
 $-1 \cdot 4 \cdot \sqrt{5}$   
 $-4\sqrt{5}$

3.  $\sqrt{49x^3}$

$\sqrt{7 \cdot 7 \cdot x \cdot x \cdot x}$   
 $7x \cdot \sqrt{x}$

4.  $\sqrt{75n^5}$

$\sqrt{25 \cdot 3 \cdot n^2 \cdot n^2 \cdot n}$   
 $5n \cdot n \cdot \sqrt{3n}$   
 $5n^2 \sqrt{3n}$

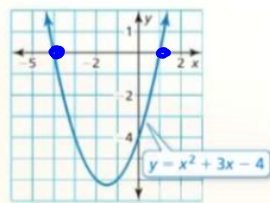
5. Fill in the blanks:

A solution to a quadratic equation is where the function crosses the x axis. Also known as the roots/xintercepts

Solve the following equations by looking at their graphs.

Write solution as x = as well as the coordinate (\_\_, 0)

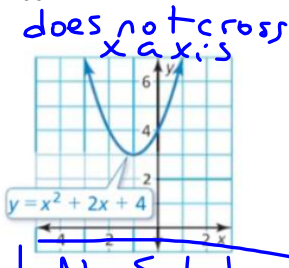
6.



$x = -4$   $x = 1$

$(-4, 0)$   $(1, 0)$

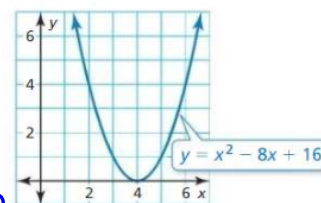
7.



No Solution

or 2 imaginary

8.



$x = 4$

$(4, 0)$

$b^2 - 4ac$

What is the discriminant of each equation and what does it mean about the solutions?

9.  $3x^2 - 42x - 96 = 0$

10.  $-3x^2 - 6x = 3$

must = 0

11.  $x^2 + 5 = 17$

= 0 1 sol.  
 = Perfect 2 Rational square solutions  
 = non perfect 2 Irrational sol. square  
 = - # negative 2 imaginary solutions

$(-42)^2 - 4(3)(-96)$

$-3x^2 - 6x - 3 = 0$   
 $a = -3, b = -6, c = -3$   
 $(-6)^2 - 4(-3)(-3)$

$x^2 + 0x - 12 = 0$   
 $b^2 - 4ac$   
 $(0)^2 - 4(1)(-12)$

2916 2 Rational solutions

0 1 solution

0 + 48  
 48 → 2 Irrat. Solutions

Solve each equation using the Quadratic Formula.

12.  $3x^2 - 42x - 96 = 0$

13.  $-6x^2 - 3x = 1$

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

$-6x^2 - 3x - 1 = 0$

$a = -6$   
 $b = -3$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(-6)(-1)}}{2(-6)}$$

$a = 3$   
 $b = -42$   
 $c = -96$

$$x = \frac{-(-42) \pm \sqrt{(-42)^2 - 4(3)(-96)}}{2(3)}$$

$$x = \frac{3 \pm \sqrt{-15}}{-12}$$

$$x = \frac{42 \pm \sqrt{2916}}{6}$$

2 Imaginary Solutions

$$x = \frac{42 + 54}{6} \text{ and } x = \frac{42 - 54}{6}$$

$$x = 16 \text{ and } x = -2$$

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Solve the equation using square roots. Round your solutions to the nearest hundredth, if necessary.

14.  $x^2 + 5 = 17$

$-5 \quad -5$

17.  $4x^2 + 25 = -75$

$-25 \quad -25$

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

$+14 \quad +14$

18.  $\sqrt{(x-1)^2} = \sqrt{0}$

16.  $\sqrt{(x+2)^2} = \sqrt{64}$

19.  $19 = 30 - 5x^2$

$-30 \quad -30$

14.  $\sqrt{x^2} = \sqrt{12}$   
 $x = \pm 3.464$

15.  $x^2 = 0$   
 $x = 0$

16.  $x+2 = \pm 8$   
 $x+2 = 8$  and  $x+2 = -8$   
 $x = 6$  and  $x = -10$

17.  $\frac{4x^2}{4} = \frac{-100}{4}$   
 $x^2 = -25$   
 No Solution

18.  $x-1 = \pm 0$   
 $x-1 = 0$   
 $x = 1$

19.  $-21 = -5x^2$   
 $\frac{-21}{-5} = \frac{-5x^2}{-5}$   
 $\sqrt{4.2} = \sqrt{x^2}$   
 $x = \pm 2.049$

20.

**MODELING WITH MATHEMATICS** At a Civil War reenactment, a cannonball is fired into the air with an initial vertical velocity of 128 feet per second. The release point is 6 feet above the ground. The function  $h = -16t^2 + 128t + 6$  represents the height  $h$  (in feet) of the cannonball after  $t$  seconds.



a. After how many seconds does the canon ball reach the ground?

$0 = -16t^2 + 128t + 6$

$h = 0$

$x = \frac{-(-128) \pm \sqrt{(128)^2 - 4(-16)(6)}}{2(-16)}$

$x = \frac{-128 + 129.491}{-32}$      $x = \frac{-128 - 129.491}{-32}$

~~$x = -0.047$~~

$x = 8.047$  seconds for the canon to reach the ground

b. After how many seconds does the canon ball reach 150 feet?

$150 = -16t^2 + 128t + 6$

$h = 150$

$0 = -16t^2 + 128t - 144$

$x = \frac{-128 \pm \sqrt{(128)^2 - 4(-16)(-144)}}{2(-16)}$

$x = \frac{-128 \pm \sqrt{7168}}{-32}$

$x = \frac{-128 + 84.664}{-32}$

$x = \frac{-128 - 84.664}{-32}$

$x = 1.354$

$x = 6.646$

After 1.354 seconds on the way up the canon reached 150 ft in the air, and again on the way back down after 6.646 seconds.