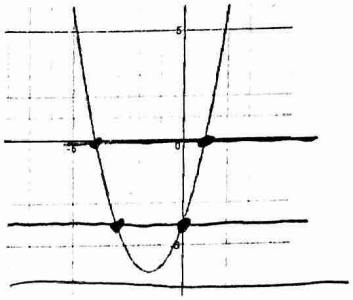
*Intermediate Algebra B*
*Solving Quadratic Equations Unit 5 Review*

*Name* _____

**5.2 *I can represent real-world situations with quadratic equations and solve using appropriate methods.***

**Level 1**

1. Use the graph of f(x) to the right to find the solutions when:



a. $f(x) = 0$

$x = -4$

$x = 1$

b. $f(x) = -4$

$x = -3$

$x = 0$

c. $f(x) = -7$

no Real Solutions

Solve each equation using any method you want. Write all answers in simplest radical form.

2. $2x^2 - 15x = 8$

$-8 \quad -8$

$2x^2 - 15x - 8 = 0$

$(-15)^2 - 4(2)(-8) = 289$

perfect square + Pos.

$(2x + 1)(x - 8) = 0$

$2x + 1 = 0$ or $x - 8 = 0$

$\frac{2x}{2} = \frac{-1}{2}$ $\quad x = 8$

$x = -\frac{1}{2}$

3. $2x^2 = 5x - 3$

$0 = -2x^2 + 5x - 3$

$(5)^2 - 4(-2)(-3) = 1$

$x = \frac{-5 \pm \sqrt{1}}{2(-2)} = \frac{-5 \pm 1}{-4}$

$\frac{-5+1}{-4} = \frac{-4}{-4} = 1$ $\quad \frac{-5-1}{-4} = \frac{-6}{-4} = \frac{3}{2}$

4. $x^2 - 6x + 25 = 0$

$(-6)^2 - 4(1)(-6) = -64$

$\sqrt{-64}$

$i\sqrt{64}$

$8i$

$x = \frac{6 \pm \sqrt{-64}}{2(1)}$

$x = \frac{6 \pm 8i}{2}$

$x = 3 \pm 4i$

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

$+3 \quad +3$

$2x^2 + 3x + 5 = 0$

$3^2 - 4(2)(5) = -31$

$\sqrt{-31}$

$i\sqrt{31}$

$x = \frac{-3 \pm i\sqrt{31}}{4}$

6. $3x^2 - 8 = 67$

$3x^2 - 75 = 0$

$(0)^2 - 4(3)(-75) = 900$

$x = \frac{0^2 \pm \sqrt{900}}{2(3)}$

$x = \frac{0 \pm 30}{6}$

$x = \frac{30}{6} = 5$ $\quad x = -\frac{30}{6} = -5$

7. $x^2 + 10x = -22$

$x^2 + 10x + 22 = 0$

$10^2 - 4(1)(22) = 12$

$\sqrt{12}$

$\sqrt{4} \cdot \sqrt{3}$

$2\sqrt{3}$

$x = \frac{-10 \pm 2\sqrt{3}}{2}$

$x = -5 \pm \sqrt{3}$

8. $3(x-1)^2 - 8 = 100$

$3(x-1)(x-1) - 8$

$3(x^2 - x - x + 1) - 8$

$3(x^2 - 2x + 1) - 8$

$3x^2 - 6x + 3 - 8$

$3x^2 - 6x - 5 = 100$

$3x^2 - 6x - 105 = 0$

$(-6)^2 - 4(3)(-105) = \sqrt{1296}$

$36$

$x = \frac{6 \pm 36}{2(3)}$

$x = \frac{6 \pm 36}{6}$

$x = 1 \pm 6$

$x = 1 + 6$

$x = 1 - 6$

$x = 7$

$x = -5$

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

$(-7)^2 - 4(1)(-18) = 121$

$(x + 9)(x - 2)$

$x + 9 = 0$ $\quad x - 2 = 0$

$x = -9$ $\quad x = 2$

10. $4x^2 = -36$

$4x^2 + 36 = 0$

$0^2 - 4(4)(36) = -576$

$\sqrt{-576}$

$24i$

$\frac{0^2 \pm 24i}{4(4)} = \frac{\pm 24i}{8} =$

$\frac{+24}{8} = \frac{24i}{8}$ $\quad \frac{-24i}{8}$

$x = 3i, -3i$

$x = \pm 3i$

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$\sqrt{1152}$
$\sqrt{576} \cdot \sqrt{2}$
$24\sqrt{2}$

11. $3(x+5)^2+4=100$

$3(x+5)(x+5)+4=100$
$3(x^2+10x+25)+4=100$
$3x^2+30x+75+4=100$

$3x^2+30x+79=100$
$3x^2+30x-21=0$
$30^2-4(3)(-21)=1152$

$x=\frac{-30\pm 24\sqrt{2}}{3(2)}$ $x=\frac{-30\pm 24\sqrt{2}}{6}$ $x=\frac{-5\pm 24\sqrt{2}}{6}$

12. John solved an equation and got the following solution: $x = \pm 5i$. Which of the equations below could have been John's question?

A. $x^2 - 25 = 0$
B. $x^2 = -5$
C. $x^2 - 5x + 25 = 0$
D. $x^2 + 25 = 0$
E. $-5x^2 = -25$

**Level 2/3**

Use decimals

13. A model rocket is launched from the roof of a building. Its flight path is modeled by the equation below, where *h* is the height of the rocket above the ground in meters and *t* is the time after the launch in seconds. When did the rocket hit the ground?

$$h(t) = -5t^2 + 30t + 10$$

$0 = -5t^2+30t+10$

6.32 Seconds

$30^2-4(-5)(10)=\sqrt{1100}$

$\frac{-30\pm\sqrt{1100}}{2(-5)}$ $\frac{-30\pm 33.1662}{-10}$ $\frac{-30+33.1662}{-10}=-.316\overline{2}$ $\frac{-30-33.1662}{-10}$

14. If one of the zeros of the equation $x^2 + kx - 12 = 0$ is x = 4, what is the value of k?

6.32

$(x-4)(x+3)$
$x^2+3x-4x-12$
$x-1x-12$

$k=-1$

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use decimals

15. The height, $h$, in feet of an object above the ground is $h(t) = -16t^2 + 64t + 190$. Where $t$ is the time in seconds.

a. How long until the object reaches a height of 100 feet?

$100 = -16t^2 + 64t + 190$

5.06

b. What is the maximum height of this object?

find vertex $x = \frac{-b}{2a}$, then find $y$

254

c. How long does it take the object to reach its maximum height?

$x = 2$

d. How long does it take the object to reach the ground?

Solve 5.98 Seconds

***5.3 I can determine the number of real and non-real solutions for a quadratic equation.***

**Level 1:**

Find the discriminant and state the number and type of solutions.

1. $5x^2 - 11x + 6 = 0$ Discriminant: Number and Type of Solutions:

$(-11)^2 - 4(5)(6) = 1$ 1 2 Real

2. $3x^2 + 2x = -1$ Discriminant: Number and Type of Solutions:

$3x^2 + 2x + 1 = 0$

$(2)^2 - 4(3)(1) = -8$ -8 2 imag. Solutions

3. $4x^2 - 12x + 9 = 0$ Discriminant: Number and Type of Solutions:

$(-12)^2 - 4(4)(9) = 0$ 0 1 Real

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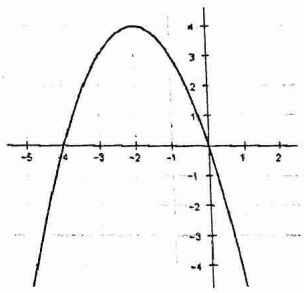
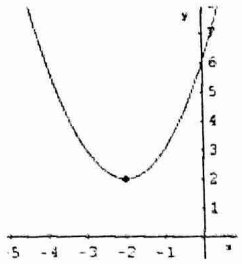
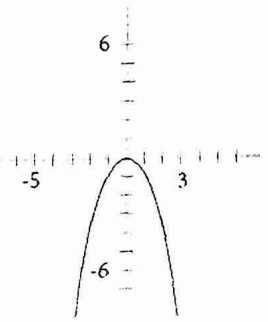
4. Decide whether each graph has a positive, negative, or zero discriminant.



Discriminant + 



Discriminant −




Discriminant 0

**Level 2-3:**

5. If an equation has solutions of ±4, describe the discriminant and explain your reasoning.

± 4 - 2 Real solutions which means discriminant is +

6. A water balloon is catapulted into the air. The height *h* of the balloon in meters is represented by the equation $h(t) = -4.9t^2 + 27t + 2.4$ where *t* represents the time in seconds. Find the discriminant and use it to determine if the balloon will ever reach a height of 45 feet.

$45 = -4.9t^2 + 27t + 2.4$

$0 = -4.9t^2 + 27t - 42.6$

$(27)^2 - 4(-4.9)(-42.6) = -105$

no Real solutions b/c discriminant is − It will never Reach that height

7. For which value(s) of T would the quadratic equation $T = x^2 + 6x + 9$ have

a) 2 real solutions?

Need 9 to be smaller

$+ > 0$

$(-6)^2 = 4(1)(9)$

$36 - 36$

6

b) 1 real solution?

$T = 0$

c) 2 imaginary solutions? need 9 to be bigger

$+ < 0$