Algebra I
U7L1-3 Review

Name: KEY

Standard form of a quadratic equation: $ax^2+bx+c=0$

The three methods we have learned for solving quadratic equations are:

1. Square Roots (L1)
2. Factoring (L2)
3. Quadratic Formula (L3)
   - only method that works for any quadratic equation

If $b=0$, always use the square root method. (L1)

The discriminant will tell the number and types of solutions which will determine which method we use to solve if $b \neq 0$. (L3)

- If $b^2-4ac<0$, the equation has no solutions.
- If $b^2-4ac=0$, the equation has one solution.
- If $b^2-4ac>0$, the equation has two solutions.
  - If the discriminant is a perfect square, the solutions will be rational. Use factoring to solve these equations.
  - If the discriminant is NOT a perfect square, the solutions will be irrational. Use the Quadratic Formula to solve these equations.

For the following problems, complete these steps:

a) **Find the discriminant**
b) **Tell the number and type of solutions**
c) **Choose the correct method to solve the equation (if there are any solutions)**
d) **Find the solutions (if there are any)**

1. $x^2 - 18x - 40 = 0$

   a. $(-18)^2 - 4(1)(-40) = \boxed{484}$

   b. two rational solutions

   c. factoring

   d. $(x-20)(x+2) = 0$

   $\boxed{x = 20, -2}$

2. $16x^2 = 56x$ $\quad 16x^2 - 56x = 0$

   a. $(-56)^2 - 4(16)(0) = \boxed{3136}$

   b. two rational solutions

   c. factoring

   d. $8x(2x - 7) = 0$

   $\boxed{x = 0, \frac{7}{2}}$

3. $x^2 + 10x - 25 = 0$

   a. $(10)^2 - 4(1)(-25) = \boxed{200}$

   b. two irrational sol

   c. Quad. Form.

   d. $x = \dfrac{-10 \pm \sqrt{200}}{2(1)}$

   $\approx \dfrac{-10 \pm 14.14}{2}$

   $\boxed{x \approx 2.07 \quad x \approx -12.07}$

$x^2-49=0$

4. ~~$x^2=1=49$~~

a. $(0)^2-4(1)(-49)=\boxed{49}$

b. two rational sol

c. square roots

d. $x^2=49$

$\boxed{x=\pm 7}$

5. $6x-4=5x^2$ $-5x^2+6x-4=0$

a. $(6)^2-4(-5)(-4)=\boxed{-44}$

b. no sol

c. X

d.

6. $-4x^2-1=4x$ $0=4x^2+4x+1$

a. $(4)^2-4(4)(1)=\boxed{0}$

b. one sol

c. Factoring or Quad Form

d. $(2x+1)^2=0$

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

or $x=\frac{-4\pm\sqrt{0}}{2(4)}$

$=\frac{-4}{8}$

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

7. $1+3x=4x^2$ $-4x^2+3x+1=0$

a. $(3)^2-4(-4)(1)=\boxed{25}$

b. two rational sol

c. factoring

d. $-4x^2-x+4x+1=0$

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

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

$\boxed{x=\frac{1}{4},\ 1}$

8. $7x^2-105=0$

a. $(0)^2-4(7)(-105)=\boxed{2940}$

b. two irrational sol.

c. square roots

d. $7x^2=105$

$x^2=15$

$\boxed{x=\pm\sqrt{15}}$

9. $4x^2+x+6=12$ $4x^2+x-6=0$

a. $(1)^2-4(4)(-6)=\boxed{97}$

b. two irrational sol

c. Quad Form

d. $x=\frac{-1\pm\sqrt{97}}{2(4)}$

$\approx\frac{-1\pm 9.85}{8}$ / $\boxed{x\approx 1.11}$ / $\boxed{x\approx -1.36}$

10. A toy rocket launched into the air from the ground has an initial velocity of 160 ft/s. Write an equation.

$h(t) = -16t^2 + 160t$

At what time will the rocket land on the ground?

$0 = -16t^2 + 160t$

$0 = -16t(t - 10)$

$t = 0$ $\quad$ **t = 10 secs**

11. A ball is launched into the air with an initial velocity of 64 ft/s and an initial height of 5 feet. Write an equation.

$h(t) = -16t^2 + 64t + 5$

Use the discriminant to determine if the ball will reach a height of 50 feet.

$50 = -16t^2 + 64t + 5$

$0 = -16t^2 + 64t - 45$

$(64)^2 - 4(-16)(-45)$

$4096 - 2880 = 1216$

$1216 > 0 \rightarrow$ two sol.

yes

12. Standing on the balcony, you drop a tennis ball to the gym floor below. The equation $h(t) = -16t^2 + 15.25$ models this situation.

What does the number 15.25 represent in this situation? initial height → ball is 15.25ft above floor

What is the starting velocity of the ball? 0 ft/s

How high from the ground will the ball be after 0.5 seconds?

$h(0.5) = -16(0.5)^2 + 15.25$

$= 11.25$ ft

How long will it take the ball to reach the gym floor?

$0 = -16t^2 + 15.25$

$16t^2 = 15.25$

$t^2 \approx 0.95$

$t \approx \pm 0.97$

0.97 secs