4.1 Graphical Solutions of Quadratic Equations

REVIEW:

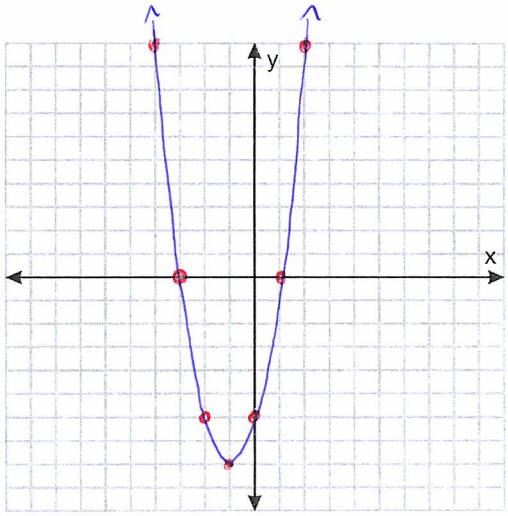
- A **QUADRATIC FUNCTION** is a function of degree two: $y = x^2$, $y = 2x^2 - 5x + 1$, $y = 2(x-3)^2 - 3$, $y = (x+1)^2$
- The place(s) where the quadratic function crosses the x axis are called the ___x-intercepts___
- A quadratic function may have ___0___, ___1___ or ___2___ x intercepts
- There are four ways that a question may be asking you to find the x intercepts. They could ask you to:
  - Find the x intercepts
  - Find the ___roots___
  - Find the ___zeros___
  - Find the ___solution___
- At this point, you may consider all four of the above terms to be exactly the same thing.

EX #1:

Using a table of values, sketch $y = 2x^2 + 4x - 6$ and identify the roots. Verify your answer(s).

$y = 2(-3)^2 + 4(-3) - 6$
$y = 2(9) - 12 - 6$
$y = 18 - 12 - 6$
$y = 0$

x	y
-3	0
-2	-6
-1	-8
0	-6
1	0
2	10
3	24



EX #2: Using technology, find the zeros to the quadratic equation $y = -\frac{4}{17}x^2 + 9x - 5$

$x = 0.564$ $x = 37.686$

EX #4: Solve the equation $-4x^2 + 15 = -3x$ by graphing the corresponding function using technology.

$x = -1.597$ $x = 2.347$

- What is the difference between a QUADRATIC EQUATION, a QUADRATIC FUNCTION and a QUADRATIC EXPRESSION?

ex/ $y = ax^2 + bx + c$ or $0 = ax^2 + bx + c$

$y = ax^2 + bx + c$ or $f(x) = ax^2 + bx + c$

$ax^2 + bx + c$

EX #3:

The manager of Jasmine's Fine Fashions is investigating the effect that raising or lowering dress prices has on the daily revenue from dress sales. The function $R(x) = 100+15x-x^2$ gives the store's revenue R, in dollars, from dress sales, where x is the price change, in dollars. Use technology to determine the price changes that will result in no revenue?

$R(x) = 100+15x-x^2$

$0 = -x^2+15x+100$

$x = -5 \quad x = 20$

If they raise the price $20 or drop the price $5 there will be no revenue.

EX #4:

The product of two consecutive positive numbers is 110. Represent this as an algebraic equation and graph to solve the equation to find the numbers.

Let x = 1st #

$x+1$ = 2nd consecutive #

P = product

$(x)(x+1) = 110$

$x^2+1x = 110$ (−110 −110)

$x^2+1x-110 = 0$

~~$x = -11$~~ $x = 10$

Not a solution in this situation.

Since the question states that they are two positive consecutive #'s The answer is 10 and 11.

EX #5:

- Is the equation $\frac{x^2-3}{5}+2=\frac{4x+9}{3}$ a quadratic equation? Yes
- If it is a quadratic equation, rewrite it in standard form.

$\frac{x^2}{5}-\frac{3}{5}+2=\frac{4x}{3}+3$ (−4/3x, −3)

$\frac{1}{5}x^2-\frac{4}{3}x-\frac{3}{5}-1=0$ (×5, ×5)

① $\frac{1}{5}x^2-\frac{4}{3}x-\frac{8}{5}=0$ (15)

② $3x^2-20x-24=0$ → same solutions

- Graph to solve the equation.

$x = -1.038 \quad x = 7.705$

when we graph it is the same x-intercepts.

4.1 Assignment Pg 215 # 2,3bd(Use a table of values to solve),4ac 5,6,7,8,11,12