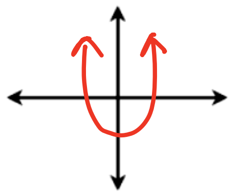
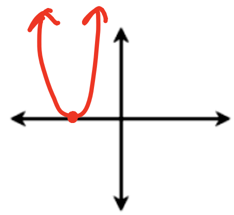
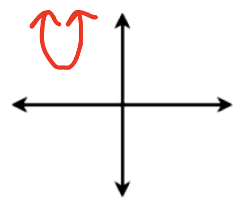
Math 3 Name Key

Unit 2B Day 2 Notes – Solving Quadratics by Graphing

Main Ideas/Questions	Notes/Examples
Solutions to a QUADRATIC EQUATION	• The solutions to a quadratic equation are the points at which the function intersects the x - axis. • The solutions are also referred to as zeros, roots or x - intercepts (y-column will have a zero)
Number of Solutions	**2 SOLUTIONS**  **1 SOLUTION**  **NO REAL SOLUTIONS** 
SOLVE BY GRAPHING	**Directions:** Find the solutions to each quadratic equation by graphing.

Solutions:

1. $x=1$ $x=-3$
2. $x=-5$ $x=-5$
3. $x=4$ $x=2$

1. $f(x)=x^2+2x-3$

Graphing Calc:

1). Go to y=

2). Put quadratic in y_1

3). Hit 2nd Graph

4). In table: look for zero in y-colum

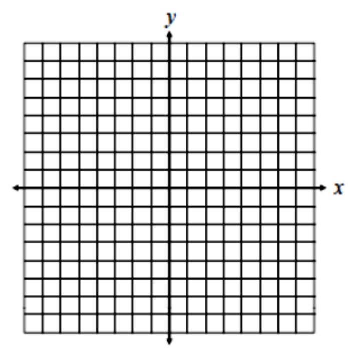
Yellow Calc:

1). Hit table

2). Put quadratic in y=

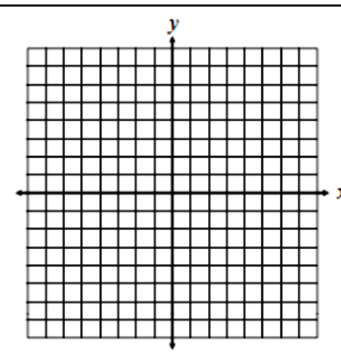
3). Hit Enter until you see the table.

4). look for zero in y-column



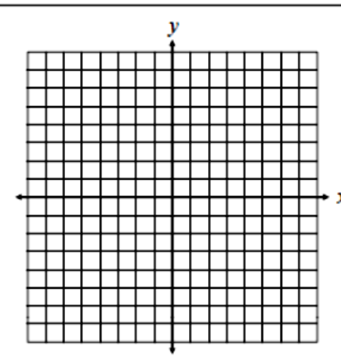
2. $f(x)=-x^2-10x-25$

$x=-5$
(mult. 2)



3. $f(x)=x^2-6x+8$

$x=4$ $x=2$



Solutions:

4. $x=-7$ $x=-4$

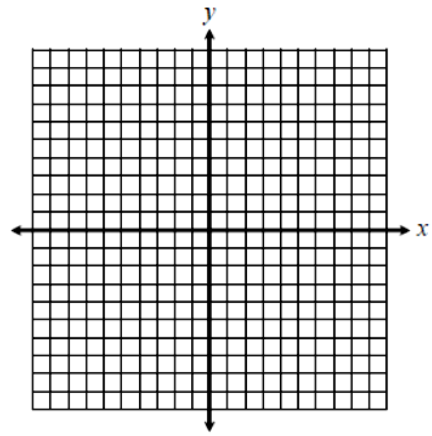
5. $x=-3$ $x=3$

6. $x=0$ $x=-3$

7. No Real Solutions

4. $f(x) = -x^2 - 11x - 28$

$x = -7$ $x = -4$

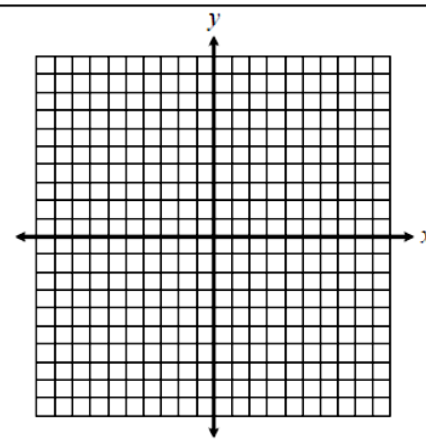


5. $f(x) = x^2 - 9$

$x = -3$ $x = 3$

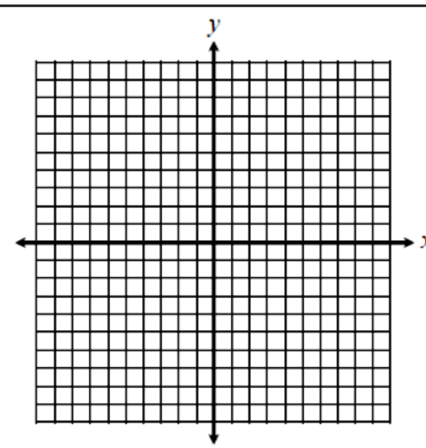
or

$x = \pm 3$



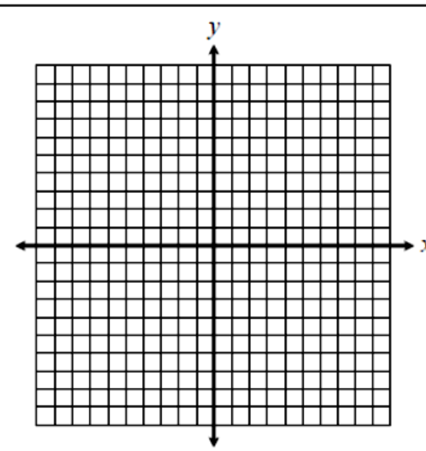
6. $f(x) = 2x^2 + 6x$

$x=0$ $x = -3$



7. $f(x) = -x^2 + 8x - 17$

No real Solutions



Using the graphing calculator to find the real zeros.

Steps:

1. If necessary, turn the quadratic equation into a quadratic function by setting it equal to y.

2. Type the equation into Y1; Set Y2=0

3. Graph the function then use the CALC feature (2nd trace, Option 5: INTERSECT) to find the locations of where the function crosses the x-axis.

<u>Examples:</u> Find the real zeros for the following.

8. $x^2+6x+4=0$

$x=-5.24$ $x=-0.76$

9. $0=4x^2+3x-1$

$x=-1$ $x=0.25$

10. $3x^2+5x-1=\cancel{8}$

$-8 \quad -8$

$3x^2+5x-9=0$

$x=-2.76$ $x=1.09$

Simplifying Radicals & Solving by Square Root Property

Steps for Simplifying Radicals	**Case 1: PERFECT SQUARES – Take the square root of the number**
	Case 2: Non – Perfect Squares – Use calculator **Steps for Calculator:** **Go to Y =** **Type # under the radical divided by x^2** **Look for smallest #, that is not a decimal, in the y – column.** **Then write: $x-value\sqrt{y-value}$**

Examples: Simplifying Radicals		
1) $\sqrt{49}$ ± 7	2) $\sqrt{225}$ ± 15	3) $\sqrt{144}$ ± 12
4) $\sqrt{\frac{4}{9}}=\frac{\sqrt{4}}{\sqrt{9}}$ $=\pm\frac{2}{3}$	5) $\sqrt{\frac{1}{81}}=\frac{\sqrt{1}}{\sqrt{81}}$ $=\pm\frac{1}{9}$	6) $\sqrt{\frac{36}{121}}=\frac{\sqrt{36}}{\sqrt{121}}$ $=\pm\frac{6}{11}$
7) $\_\sqrt{112}$ $\pm 4\sqrt{7}$	8) $\sqrt{245}$ $\pm 7\sqrt{5}$	9) $5\sqrt{72}$ $5\times 6\sqrt{2}$ $30\sqrt{2}$

10) $9\sqrt{45}$ $9\times 3\sqrt{5}$ $27\sqrt{5}$	11) $\sqrt{250}$ $\pm 5\sqrt{10}$	12) $3\sqrt{578}$ $3\times 17\sqrt{2}$ $51\sqrt{2}$

Steps for Solving Quadratics by Square Root Property		Quadratic Equations of the form: $ax^2 \pm c = 0$ (has no middle term, bx) can be solved using the Square Root Property: If $x^2 = n$, then $x = \pm\sqrt{n}$
	1)	ISOLATE x^2
	2)	Take the SQUARE ROOT of both sides
	3)	Simplify the radical (if needed). Please " $\pm$ " to indicate both answers.

Examples: Solving Quadratics by Square Root Property

1) $\boxed{x^2} - \cancel{64} = 0$ $+\cancel{64}$ $+64$ $\sqrt{x^{\cancel{2}}} = \sqrt{64}$ $x = \pm 8$	2) $7x^2 + \cancel{8} = 15$ $-\cancel{8}$ -8 $\frac{\cancel{7}x^2}{\cancel{7}} = \frac{7}{7}$ $\sqrt{x^{\cancel{2}}} = \sqrt{1}$ $x = \pm 1$	3) $81x^2 + \cancel{5} = 21$ $-\cancel{5}$ -5 $\frac{\cancel{81}x^2}{\cancel{81}} = \frac{16}{81}$ $\sqrt{x^{\cancel{2}}} = \sqrt{\frac{16}{81}} = \frac{\sqrt{16}}{\sqrt{81}}$ $x = \pm \frac{4}{9}$
4) $8x^2 + \cancel{1} = 17$ $-\cancel{1}$ -1 $\frac{\cancel{8}x^2}{\cancel{8}} = \frac{16}{8}$ $\sqrt{x^{\cancel{2}}} = \sqrt{2}$ $x = \pm\sqrt{2}$	5) $2x^2 - \cancel{9} = 55$ $+\cancel{9}$ $+9$ $\frac{\cancel{2}x^2}{\cancel{2}} = \frac{64}{2}$ $\sqrt{x^{\cancel{2}}} = \sqrt{32}$ $x = \pm 4\sqrt{2}$	6) $9x^2 + \cancel{3} = 111$ $-\cancel{3}$ -3 $\frac{\cancel{9}x^2}{\cancel{9}} = \frac{108}{9}$ $\sqrt{x^{\cancel{2}}} = \sqrt{12}$ $x = \pm 2\sqrt{3}$
7) $\cancel{4} - 3x^2 = -77$ $-\cancel{4}$ -4 $\frac{\cancel{-3}x^2}{\cancel{-3}} = \frac{-81}{-3}$ $\sqrt{x^{\cancel{2}}} = \sqrt{27}$ $x = \pm 3\sqrt{3}$	8) $5x^2 + 10 = 310$ $x = \pm 2\sqrt{15}$	9) $\frac{-1}{2}x^2 + 1 = -39$ $x = \pm 4\sqrt{5}$