Algebra   Name ___*KEY*___
Ch 10 - Quadratics Review   Period _____
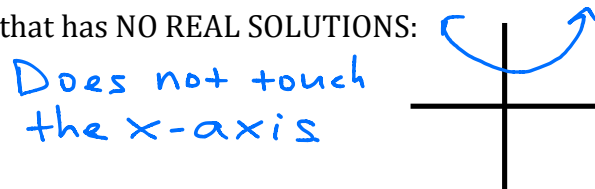   Show ALL work to earn full credit and label answers!!!
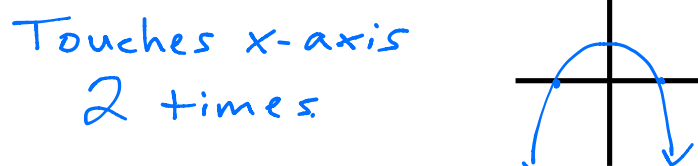**Graphing quadratic equations.**

Complete the following table.

Equation	**Sketch** a simple graph (don't use a table...I just want an estimate)	Is the vertex of the graph a **minimum** or a **maximum**?	List the transformations "wider" "narrower" "shifts up" "shifts down" "reflected"
1. $y = \frac{1}{5}x^2 + 3$	(0,3)	MIN	WIDER SHIFTS UP 3
2. $y = -8x^2$		MAX	REFLECTED OVER X-AXIS NARROWER
3. $y = 4x^2 - 1$	(0,-1)	MIN	NARROWER SHIFTS DOWN 1
4. $y = -\frac{1}{2}x^2 + 7$	(0,7)	MAX	REFLECTED OVER X-AXIS WIDER SHIFTS UP 7
5. $y = -x^2 - 2$		MAX	REFLECTED OVER X-AXIS SHIFTS DOWN 2

6. Sketch the graph of a quadratic function that has NO REAL SOLUTIONS:

Does not touch the x-axis

7. Sketch the graph of a quadratic function that has 2 solutions:

Touches x-axis 2 times

Graph the quadratic equations below.

$\dfrac{-b}{2a}$

8. $y = x^2 - 4x$ $X = \dfrac{-(-4)}{2(1)} = \dfrac{4}{2} = 2$

Verex: $(2, -4)$

Equation of the Axis of Symmetry: $X = 2$

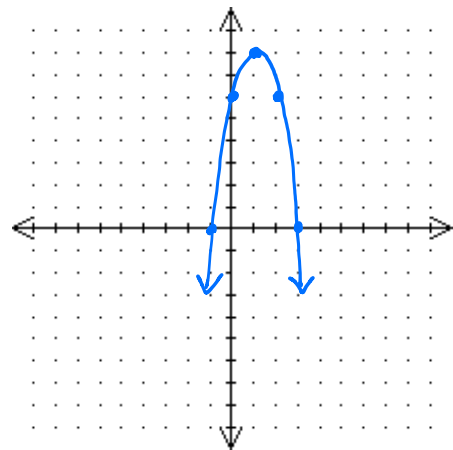| X	Y
0	$(0)^2 - 4(0) = 0 - 0 = \boxed{0}$
1	$(1)^2 - 4(1) = 1 - 4 = \boxed{-3}$
2	$(2)^2 - 4(2) = 4 - 8 = \boxed{-4}$
3	$(3)^2 - 4(3) = 9 - 12 = \boxed{-3}$
4	$(4)^2 - 4(4) = 16 - 16 = \boxed{0}$

$X = 2$

$\dfrac{-b}{2a}$

9. $y = -2x^2 + 4x + 6$ $X = \dfrac{-(4)}{2(-2)} = \dfrac{-4}{-4} = \boxed{1}$

Verex: $(1, \quad)$

Equation of the Axis of Symmetry: $X = 1$

X	Y
-1	$-2(-1)^2 + 4(-1) + 6 = -2 - 4 + 6 = \boxed{0}$
0	$-2(0)^2 + 4(0) + 6 = 0 + 0 + 6 = \boxed{6}$
1	$-2(1)^2 + 4(1) + 6 = -2 + 4 + 6 = \boxed{8}$
2	$-2(2)^2 + 4(2) + 6 = -8 + 8 + 6 = \boxed{6}$
3	$-2(3)^2 + 4(3) + 6 = -18 + 12 + 6 = \boxed{0}$

Solving quadratic equations.

Solve the quadratic equations, using the method of YOUR CHOICE!
Show ALL of your work! If you have a decimal, round to the <u>nearest hundredth</u>.
Write "NO SOLUTION" if there is no solution.

1. $\sqrt{x^2} = \sqrt{49}$

$X = 7$
$X = -7$

2. $\dfrac{3x^2}{3} = \dfrac{75}{3}$

$\sqrt{x^2} = \sqrt{25}$

$X = 5$
$X = -5$

3. $\dfrac{-2x^2}{-2} = \dfrac{40}{-2}$

$x^2 = -20$

$\sqrt{x^2} = \sqrt{-20}$

No Real Solution

4. $10 + 4x^2 = 34$
$\quad -10 \qquad\qquad -10$

$\dfrac{4x^2}{4} = \dfrac{24}{4}$

$x^2 = 6$

$\sqrt{x^2} = \sqrt{6}$

$X = \sqrt{6}$ or 2.45
$X = -\sqrt{6}$ or -2.45

5. $-2x^2 + 22 = 4$
$\qquad\quad -22 \quad -22$

$\dfrac{-2x^2}{-2} = \dfrac{+18}{+2}$

$x^2 = 9$

$\sqrt{x^2} = \sqrt{9}$

$X = 3$
$X = -3$

6. $x^2 - 2x - 24 = 0$ Must Factor or use Quadratic Formula. x^2 and x.

$(x - 6)(x + 4) = 0$

$X - 6 = 0 \qquad\quad X + 4 = 0$
$\quad + 6 \quad +6 \qquad\quad -4 \quad -4$

$X = 6 \qquad\qquad X = -4$

7. $x^2 - 7x = -12$ Must Factor or use Quadratic Formula. x^2 and x.

$x^2 - 7x + 12 = 0$

$(x - 3)(x - 4) = 0$

$X = 3 \qquad X = 4$

8. $3x^2 - 11x - 4 = 0$ Must Factor or use Quadratic Formula. x^2 and x.

$(3x + 1)(x - 4) = 0$

$3x + 1 = 0 \qquad x - 4 = 0$
$\quad -1 \quad -1 \qquad\qquad X = 4$

$\dfrac{3x}{3} = \dfrac{-1}{3}$

$X = -\dfrac{1}{3}$

9. $2x^2 + 4x - 7 = 0$ **Doesn't Factor. Must use Quadratic Formula. x^2 and x.**

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

$$= \frac{-4 \pm \sqrt{(4)^2 - (4)(2)(-7)}}{2(2)}$$

$$= \frac{-4 \pm \sqrt{16 + 56}}{4}$$

$$= \frac{-4 \pm \sqrt{72}}{4} \qquad \frac{-4 + \sqrt{72}}{4} = \boxed{1.12}$$

$$\longrightarrow \frac{-4 - \sqrt{72}}{4} = \boxed{-3.12}$$

10. $2x^2 + 2x - 40 = 0$ **Must Factor or use Quadratic Formula. x^2 and x.**

$$2(x^2 + x - 20) = 0$$

$$2(x+5)(x-4) = 0$$

$$2 \neq 0 \qquad x+5 = 0 \qquad x-4 = 0$$

$$\boxed{X = -5} \qquad \boxed{x = 4}$$

Use the FALLING OBJECT formula $h = -16t^2 + s$ **to solve the problem.**

Final height — initial height

11. A ball is dropped from a height of 1200 feet. Disregard air resistance. How long will the object take to hit the ground?

$$0 = -16t^2 + 1200$$
$$+16t^2 \qquad +16t^2$$

$$\frac{16t^2}{16} = \frac{1200}{16}$$

$$t^2 = 75$$
$$\boxed{t = \sqrt{75}}$$

11. ___8.66 seconds___

12. Find the height of the ball, h, after 2 seconds (when t = 2).

$$h = -16(2)^2 + 1200$$

$$h = 1136 \text{ ft.}$$

12. ___1136 feet___
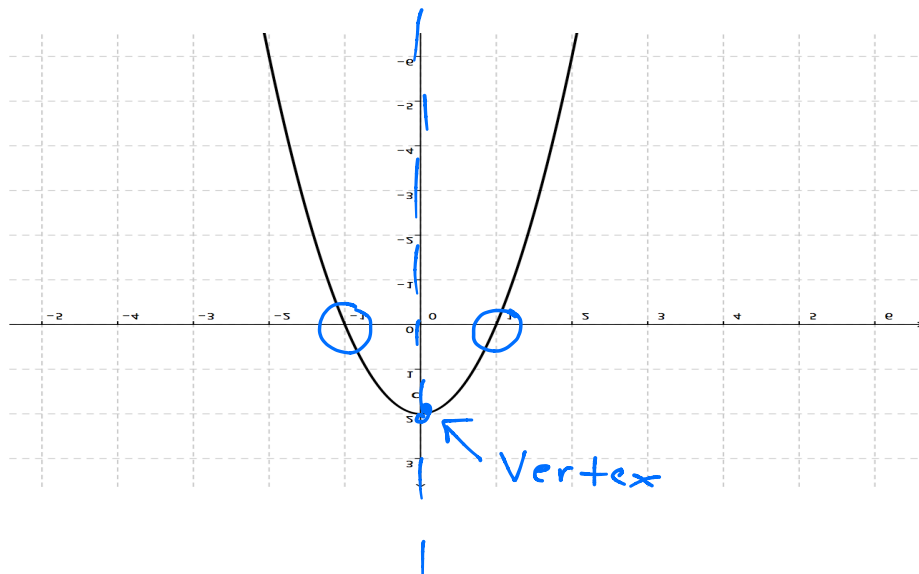
13. Use the graph below for #13.

Up or down? ___Up___

Vertex = $(0, -2)$

Is the vertex a max or min? ___Min___

Draw in the line of symmetry? $x = 0$ / y-axis

Circle the roots/zeros and then write them down $(-1, 0)$ and $(1, 0)$

Vertex

1. GCF
2. Perfect Squares
3. ( )( )

Factoring Review for the ReTest of Chapter 9
Factor.

1. $x^3 - 11x^2 + 28x$ Multiple Choice. Circle your answer. SHOW WORK.

$$\frac{28}{\begin{array}{c|c} 1 & 28 \\ 2 & 14 \\ 4 & 7 \end{array}}$$

$x(x^2 - 11x + 28)$

$x(x - \;)(x - \;)$

A. $x(x - 7)(x - 4)$
B. $x(x + 2)(x + 14)$
C. $x(x + 7)(x + 4)$
D. $x(x - 7)(x + 4)$

2. $2x^2 - 7x - 15$

$$\frac{15}{\begin{array}{c|c} 1 & 15 \\ 3 & 5 \end{array}}$$

$(2x + 3)(x - 5)$
    +3x
    -10x
    -7x

$(2x + 3)(x - 5)$

3. $10x^2 - 7x + 1$

$$\frac{1}{\begin{array}{c|c} 1 & 1 \end{array}}$$

$(5x - 1)(2x - 1)$
    -2x
    -5x
    -7x

$(5x - 1)(2x - 1)$

4. $3x^2 - 30x + 27$

$$\frac{9}{\begin{array}{c|c} 1 & 9 \\ 3 & 3 \end{array}}$$

$3(x^2 - 10x + 9)$

$3(x - 9)(x - 1)$

$3(x - 9)(x - 1)$

5. $4x^7 + 20x^3$

$$4x^3(x^4 + 5)$$

cannot factor any further

$$4x^3(x^4 + 5)$$

6. $3x^2 + 13x + 4$

$\dfrac{4}{\begin{array}{c|c} 1 & 4 \\ 2 & 2 \end{array}}$

$(3x + 1)(x + 4)$

+1x
+12x
+13x

$$(3x+1)(x+4)$$

7. $5x^2 - 45$

Perfect Square

$$5(x^2 - 9)$$

$$5(x + 3)(x - 3)$$

$$5(x+3)(x-3)$$

8. $6x^2 - 7x - 20$ Challenge!

$\dfrac{20}{\begin{array}{c|c} 1 & 20 \\ 2 & 10 \\ 4 & 5 \end{array}}$

$(2x - 5)(3x + 4)$

-15x
+8x
-7x

$$(2x-5)(3x+4)$$