Mr. Fahrenbacher
Algebra 12-22
Quiz 10.1-10.4, 9.4 Review

What you have to know for the quiz:

- Graph a quadratic equation
  - find the axis of symmetry
  - find the y-intercept
  - find the vertex
  - use the symmetry
- Solve a quadratic equation by graphing (zeros = x-intercepts)
  - by hand
  - on calculator
- Solve a quadratic equation by undo (only one x-term!)
  - ± Notation
  - Exact and Approximate Answers
  - Reducing Radicals
- Solve a quadratic by factoring
  - Binomials (Common factor)
  - Trinomials when a = 1 (Short Cut)
  - Trinomials when a ≠ 1 (AC)
  - Trinomials when all three terms share common factor

Solve the following quadratic equations by factoring.

1) (x + 1)(x - 5) = 0

2) (2m + 3)(4m + 3) = 0

3) 2y(y - 6) = 0

4) $x^2 + 7x + 15 = 5$

5) $3r^2 - 16r - 7 = 5$

6) $-x^2 - 5x - 6 = 0$

7) $4x^2 - 12x - 40 = 0$

8) $8x^2 = 4x$

Radical Operations.

9) Approximate to two decimal places: $\sqrt{11}$

10) Write in simplest form: $\sqrt{96}$

11) Simplify: $5\sqrt{2} + \sqrt{8}$

Solve the following quadratic equations by undo. Write your answers in exact, simplified form.

12) $x^2 = 36$

13) $x^2 = 20$

14) $4x^2 = 100$

15) $x^2 + 6 = 30$

16) $(x+1)^2 = 49$

17) $3(x-5)^2 = 27$

18) $\frac{1}{4}(x+2)^2 = 4$

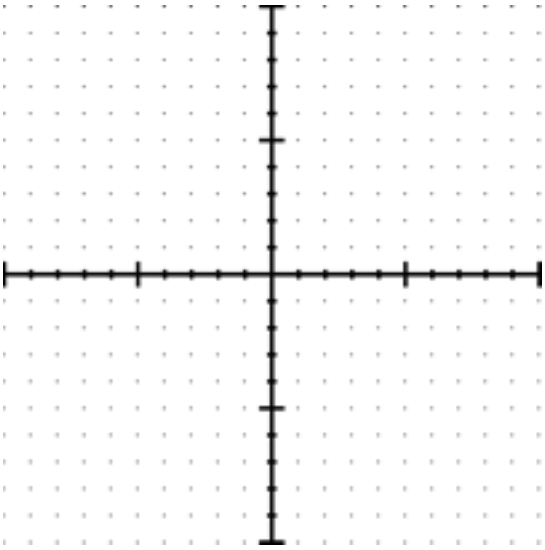
19) $2(x+1)^2 - 8 = 72$

20) $(x-1)^2 + 3 = 3$

21) $4x^2 + 10 = 2$

22) Solve the following quadratic equation by making a graph by hand.

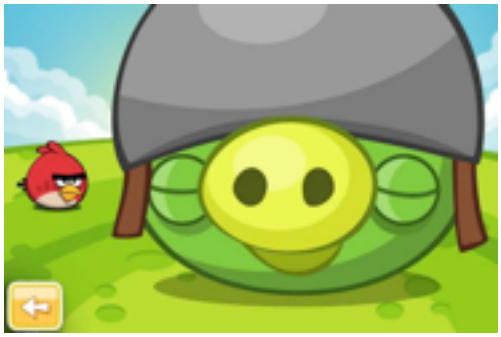
$$0 = \frac{1}{2}x^2 + 2x - 6$$



Solutions: _____

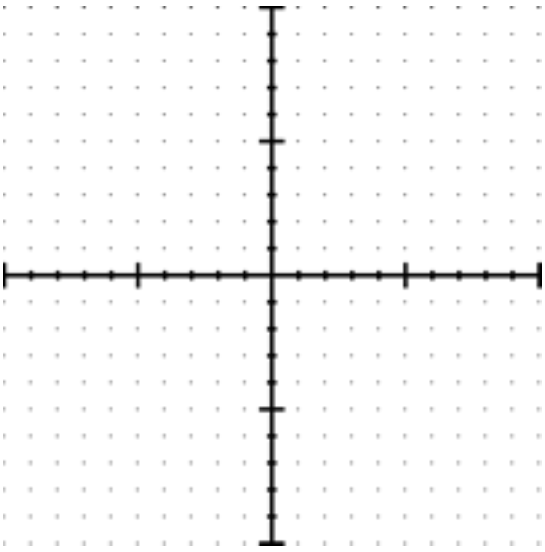
23) The path of an Angry Bird is modeled by the equation below. When will the angry bird hit the ground. Round your answer(s) to two decimal places. If there is a pig 12 feet away, do you think the angry bird hits its target?

$$y = -\frac{1}{5}x^2 + 2.5x + 2$$



24) Graph the following quadratic equation and find the indicated information.

$$y = -2x^2 + 8x + 1$$



Vertex:

Maximum:

Minimum:

Axis of Symmetry:

Y-intercept:

Worked Out Solutions

1) $(x+1)(x-5)=0$	2) (2m + 3)(4m + 3) = 0	3) 2y(y - 6) = 0	4) $x^2+7x+15=5$
$x+1=0 \quad x-5=0$ $x=-1 \quad x=5$	$2m+3=0 \quad 4m+3=0$ $2m=-3 \quad 4m=-3$ $m=-\frac{3}{2} \quad m=-\frac{3}{4}$	$2y=0 \quad y-6=0$ $y=0 \quad y=6$	$x^2+7x+10=0$ Numbers that multiply to 10 and add to 7: 2 and 5. $(x+2)(x+5)=0$ $x+2=0 \quad x+5=0$ $x=-2 \quad x=-5$

5) $3r^2-16r-7=5$	6) $-x^2-5x-6=0$	7) $4x^2-12x-40=0$	8) $8x^2=4x$
$3r^2-16r-12=0$ AC = -36 Numbers that multiply to -36 and add to -16: -18 and 2 $3r^2-18r+2r-12=0$ $3r(r-6)+2(r-6)=0$ $(r-6)(3r+2)=0$ $r-6=0 \quad 3r+2=0$ $r=6 \quad 3r=-2$ $r=-\frac{2}{3}$	I added everything on the left to the right side to make it easier: $0=x^2+5x+6$ Numbers that multiply to 6 and add to 5: 2 and 3 $0=(x+2)(x+3)$ $x+2=0 \quad x+3=0$ $x=-2 \quad x=-3$	They all have a common factor of 4: $4(x^2-3x-10)=0$ Numbers that multiply to -10 and add to -3: -5 and 2 $4(x-5)(x+2)=0$ $x-5=0 \quad x+2=0$ $x=5 \quad x=-2$	$8x^2-4x=0$ $4x(2x-1)=0$ $4x=0 \quad 2x-1=0$ $x=0 \quad 2x=1$ $x=\frac{1}{2}$

9) Approximate to two decimal places: $\sqrt{11}$	10) Write in simplest form: $\sqrt{96}$	11) Simplify: $5\sqrt{2}+\sqrt{8}$
$\sqrt{11}\approx 3.32$	$\sqrt{96}$ $\sqrt{16\cdot 6}$ $4\sqrt{6}$	$5\sqrt{2}+\sqrt{8}$ $5\sqrt{2}+\sqrt{4\cdot 2}$ $5\sqrt{2}+2\sqrt{2}$ $7\sqrt{2}$

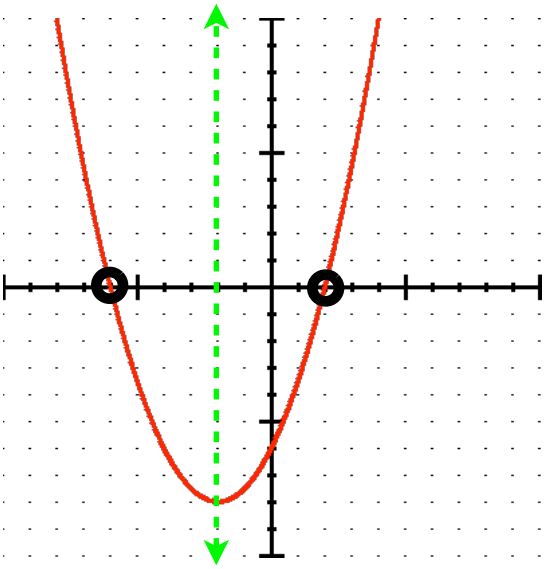
12) $x^2 = 36$	13) $x^2 = 20$	14) $4x^2 = 100$	15) $x^2 + 6 = 30$
$\sqrt{x^2} = \pm\sqrt{36}$ $x = \pm 6$	$\sqrt{x^2} = \pm\sqrt{20}$ $x = \pm\sqrt{4 \cdot 5}$ $x = \pm 2\sqrt{5}$	$x^2 = 25$ $\sqrt{x^2} = \pm\sqrt{25}$ $x = \pm 5$	$x^2 = 24$ $\sqrt{x^2} = \pm\sqrt{24}$ $x = \pm\sqrt{4 \cdot 6}$ $x = \pm 2\sqrt{6}$

16) $(x+1)^2 = 49$	17) $3(x-5)^2 = 27$	18) $\frac{1}{4}(x+2)^2 = 4$	19) $2(x+1)^2 - 8 = 72$
$\sqrt{(x+1)^2} = \pm\sqrt{49}$ $x + 1 = \pm 7$ $x = -1 \pm 7$	$(x-5)^2 = 9$ $\sqrt{(x-5)^2} = \pm\sqrt{9}$ $x - 5 = \pm 3$ $x = 5 \pm 3$	$(x+2)^2 = 16$ $\sqrt{(x+2)^2} = \pm\sqrt{16}$ $x + 2 = \pm 4$ $x = -2 \pm 4$	$2(x+1)^2 = 80$ $(x+1)^2 = 40$ $\sqrt{(x+1)^2} = \pm\sqrt{40}$ $x + 1 = \pm\sqrt{4 \cdot 10}$ $x + 1 = \pm 2\sqrt{10}$ $x = -1 \pm 2\sqrt{10}$

20) $(x-1)^2 + 3 = 3$	21) $4x^2 + 10 = 2$
$(x-1)^2 = 0$ $\sqrt{(x-1)^2} = \pm\sqrt{0}$ $x - 1 = 0$ $x = 1$	$4x^2 = -8$ $x^2 = -2$ $\sqrt{x^2} = \pm\sqrt{-2}$ No Solutions

22) Solve the following quadratic equation by making a graph by hand.

$$0 = \frac{1}{2}x^2 + 2x - 6$$



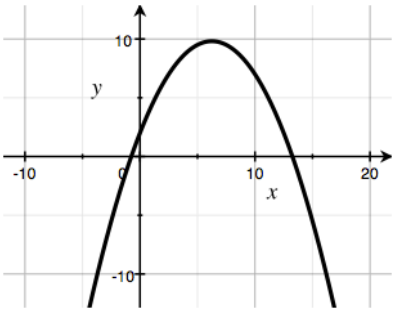
$$Axis: x = \frac{-b}{2a} = \frac{-2}{2\left(\frac{1}{2}\right)} = \frac{-2}{1} = -2$$

x	y
-2	$\frac{1}{2}(-2)^2 + 2(-2) - 6 = \frac{1}{2}(4) - 4 - 6 = 2 - 4 - 6 = -8$
0	-6 (y-intercept)
2	$\frac{1}{2}(2)^2 + 2(2) - 6 = \frac{1}{2}(4) + 4 - 6 = 2 + 4 - 6 = 0$

Solutions: x = -6 or 2

23) The path of an Angry Bird is modeled by the equation below. When will the angry bird hit the ground. Round your answer(s) to two decimal places. If there is a pig 12 feet away, do you think the angry bird hits it's target?

$$y = -\frac{1}{5}x^2 + 2.5x + 2$$



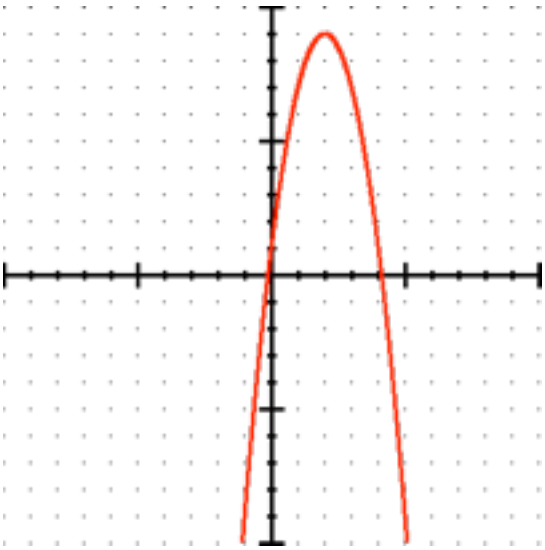
My Window:
XMin: -10
XMax: 20
YMin: -15
YMax: 15

Zero Finder Says:
x = -0.75
x = 13.25

The angry bird will overshoot the Pig =(

24) Graph the following quadratic equation and find the indicated information.

$$y = -2x^2 + 8x + 1$$



Vertex: (2, 9)

Maximum: 9

Minimum: none

Axis of Symmetry: x = 2

Y-intercept: (0, 1)

$$Axis: x = \frac{-b}{2a} = \frac{-8}{2(-2)} = \frac{-8}{-4} = 2$$

x	y
2	$-2(2)^2 + 8(2) + 1 = -2(4) + 16 + 1 = -8 + 16 + 1 = 9$
1	$-2(1)^2 + 8(1) + 1 = -2(1) + 8 + 1 = -2 + 8 + 1 = 7$
0	1 (y-intercept)