AGS 2 – Module 03B
Review #1

Name Key
Period

This is a review for your Module 3 test over sections 3.5 – 3.9.
It is very important that you understand the different methods available to solve quadratics and you can show each of these methods with accurate calculations.

1. Simplify each radical. State if the solution is a real solution or an imaginary solution.

a) $\sqrt{12} = 2\sqrt{3}$ real

b) $\sqrt{20} = 2\sqrt{5}$ real

c) $5\sqrt{18} = 5 \cdot 3\sqrt{2} = 15\sqrt{2}$ real

d) $\sqrt{-50} = 5i\sqrt{2}$ imaginary

e) $\sqrt{-25} = 5i$ imaginary

f) $\sqrt{42} = \sqrt{42}$ real

2. Solve each equation by taking the square root. If the solutions are imaginary, state this.

a) $\sqrt{x^2} = \pm\sqrt{40}$
$x = \pm 2\sqrt{10}$

b) $\frac{2(x+4)^2}{2} = \frac{48}{2}$
$\sqrt{(x+4)^2} = \pm\sqrt{24}$
$x + 4 = \pm 2\sqrt{6}$
$-4 \quad -4$
$x = -4 \pm 2\sqrt{6}$

c) $x^2 + 20 = 36$
$-20 \quad -20$
$\sqrt{x^2} = \pm\sqrt{16}$
$x = \pm 4$

d) $2(x+1)^2 - 10 = 30$
$+10 \quad +10$
$\frac{2(x+1)^2}{2} = \frac{40}{2}$
$\sqrt{(x+1)^2} = \pm\sqrt{20}$
$-1 \quad -1$
$x = -1 \pm 2\sqrt{5}$

e) $\sqrt{(x-3)^2} = \pm\sqrt{25}$
$+3 \quad +3$
$x = 3 \pm 5$
$= 3+5 = 8$
$= 3-5 = -2$

f) $\frac{2x^2}{2} = \frac{-50}{2}$
$\sqrt{x^2} = \pm\sqrt{-25}$
$x = \pm 5i$

3. Solve each equation completing the square.

a) $x^2 + 10x = 24$

$x^2 + 10x + 25 - 24 - 25 = 0$

$(x+5)^2 - 49 = 0$

$+49 \quad +49$

$\sqrt{(x+5)^2} = \pm\sqrt{49}$

$-5 \quad -5$

$x = -5 \pm 7$ → $-5+7 = 2$, $-5-7 = -12$

b) $x^2 + 8x - 12 = 0$

$x^2 + 8x + 16 - 12 - 16 = 0$

$(x+4)^2 - 28 = 0$

$+28 \quad +28$

$\sqrt{(x+4)^2} = \pm\sqrt{28}$ → $14, 7$; $2, 2$

$-4 \quad -4$

$x = -4 \pm 2\sqrt{7}$

c) $x^2 - 6x + 20 = 0$

$x^2 - 6x + 9 + 20 - 9 = 0$

$(x-3)^2 + 11 = 0$

$-11 \quad -11$

$\sqrt{(x-3)^2} = \pm\sqrt{-11}$

$+3 \quad +3$

$x = 3 \pm i\sqrt{11}$

d) $x^2 + 4x = 12$

$x^2 + 4x + 4 - 12 - 4 = 0$

$(x+2)^2 - 16 = 0$

$+16 \quad +16$

$\sqrt{(x+2)^2} = \pm\sqrt{16}$

$-2 \quad -2$

$x = -2 \pm 4$ → $-2+4 = 2$, $-2-4 = -6$

4. Solve each equation by factoring. Remember to set each equation equal to zero first.

a) $x^2 + 19x - 20 = 0$

$(x+20)(x-1) = 0$

$x = -20 \quad x = 1$

$c = -20$	$b = 19$
$20 \cdot -1$	$+19$

b) $x^2 + 10x + 16 = 0$

$(x+2)(x+8) = 0$

$x = -2 \quad x = -8$

$c = 16$	$b = 10$
$2 \cdot 8$	10

c) $x^2 - 5x = 36$

$x^2 - 5x - 36 = 0$

$(x-9)(x+4) = 0$

$x = 9 \quad x = -4$

$c = -36$	$b = -5$
$-9 \cdot 4$	-5

d) $x^2 + 12x + 20 = 0$

$(x+2)(x+10) = 0$

$x = -2 \quad x = -10$

$c = 20$	$b = 12$
$2 \cdot 10$	12

e) $3x^2 - 16x + 5 = 0$

$(3x-1)(x-5) = 0$

$x = 1/3 \quad x = 5$

$a \cdot c = 15$	$b = -16$
$-1 \cdot -15$	-16

	$(3x-1)$
x	$3x^2 \quad -x$
-5	$-15x \quad 5$

f) $x^2 = -9x - 14$

$x^2 + 9x + 14 = 0$

$(x+2)(x+7) = 0$

$x = -2 \quad x = -7$

$c = 14$	$b = 9$
$2 \cdot 7$	9

5. Solve each equation by quadratic formula. Remember to set each equation equal to 0 first.

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

a) $x^2 - 9x - 10 = 0$

$a = 1$, $b = -9$, $c = -10$

$$x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(1)(-10)}}{2(1)}$$

$$x = \frac{9 \pm \sqrt{121}}{2}$$

$$x = \frac{9 \pm 11}{2} \quad \nearrow = \frac{9+11}{2} = \frac{20}{2} = 10$$

$$\searrow = \frac{9-11}{2} = \frac{-2}{2} = -1$$

b) $x^2 + 4x + 14 = 0$

$a = 1$, $b = 4$, $c = 14$

$$x = \frac{-(4) \pm \sqrt{(4)^2 - 4(1)(14)}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{-40}}{2}$$

$$x = \frac{-4 \pm 2\sqrt{10}}{2}$$

$$x = -2 \pm i\sqrt{10}$$

$i\sqrt{40}$

$2 \cdot 20$

$2 \cdot 10$

2

c) $x^2 - 5x + 2 = 0$

$a = 1$, $b = -5$, $c = 2$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(2)}}{2(1)}$$

$$x = \frac{5 \pm \sqrt{17}}{2}$$

d) $2x^2 + 9x - 4 = 0$

$a = 2$, $b = 9$, $c = -4$

$$x = \frac{-(9) \pm \sqrt{(9)^2 - 4(2)(-4)}}{2(2)}$$

$$x = \frac{-9 \pm \sqrt{113}}{4}$$

$x^2 - 7x + 11 = 0$

e) $3x^2 + 5x - 2 = 0$

$a = 3$, $b = 5$, $c = -2$

$$x = \frac{-(5) \pm \sqrt{(5)^2 - 4(3)(-2)}}{2(3)}$$

$$x = \frac{-5 \pm \sqrt{49}}{6}$$

$$x = \frac{-5 \pm 7}{6} \quad \nearrow = \frac{-5+7}{6} = \frac{2}{6} = \frac{1}{3}$$

$$\searrow = \frac{-5-7}{6} = \frac{-12}{6} = -2$$

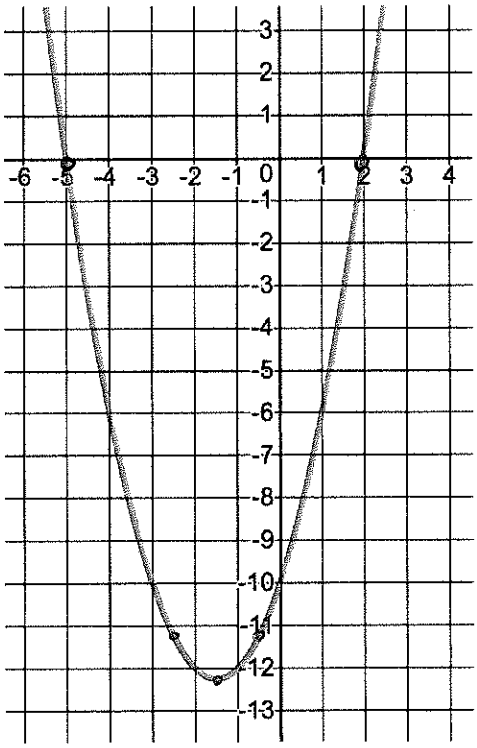
f) $x^2 - 7x = -11$

$a = 1$, $b = -7$, $c = 11$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(1)(11)}}{2(1)}$$

$$x = \frac{7 \pm \sqrt{5}}{2}$$

6. Use the graph below to create an equation, then transform it into the other 2 forms, so that you have the equations written 3 different ways: Standard Form, Vertex Form, and Factored Form.
Then state the x-intercepts



F $y = 1(x+5)(x-2)$

S $y = 1x^2 + 3x - 10$

✓ $y = 1(x+1.5)^2 - 12.25$

$(x+5)$

	x	5
x	x^2	$5x$
-2	$-2x$	-10

$= x^2 + 5x - 2x - 10$

$= x^2 + 3x - 10$

$y = x^2 + 3x + 2.25 - 10 - 2.25$

$y = (x+1.5)^2 - 12.25$

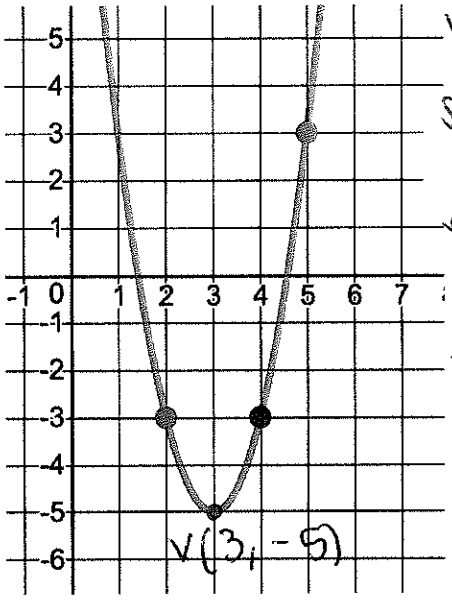
x-intercepts:

$(-5, 0)$

$(2, 0)$

$\left(\frac{b}{2}\right)^2 = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$

7. Use the graph below to create an equation using Vertex Form. Then transform the equation into standard form. Use either form to find the x-intercepts.



✓ $y = 2(x-3)^2 - 5$

S $y = 2x^2 - 12x + 13$

bonus: $y = 2(x - 3 + \sqrt{2.5})(x - 3 - \sqrt{2.5})$

$(x-3)$

	x	-3
x	x^2	$-3x$
-3	$-3x$	9

$= x^2 - 6x + 9$

$y = 2(x^2 - 6x + 9) - 5$

$y = 2x^2 - 12x + 18 - 5$

$y = 2x^2 - 12x + 13$

bonus: x-intercepts:

$x = 3 \pm \sqrt{2.5}$

$0 = 2(x-3)^2 - 5$

$+5 \quad +5$

$\frac{5}{2} = \frac{2}{2}(x-3)^2$

$\pm\sqrt{2.5} = \sqrt{(x-3)^2}$

$x - 3 = \pm\sqrt{2.5}$

$+3 \quad +3$

$x = 3 \pm \sqrt{2.5}$