) – Module 03B
v #2

Name Key
Period

ou need to show all your work.

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

a) $\sqrt{45} = 3\sqrt{5}$

3 | 15
3 | 5

b) $\sqrt{-8} = 2i\sqrt{2}$

2 | 4
2 | 2

c) $-2\sqrt{28} = -2 \cdot 2\sqrt{7} = -4\sqrt{7}$

2 | 14
2 | 7

d) $\sqrt{150} = 5\sqrt{6}$

2 | 75
3 | 25
5 | 5

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

a) $\frac{2(x-1)^2}{2} = \frac{28}{2}$

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

$x - 1 = \pm\sqrt{14}$

$+1 \quad +1$

$x = 1 \pm \sqrt{14}$

b) $2(x+5)^2 + 32 = 120$

$-32 \quad -32$

$\frac{2(x+5)^2}{2} = \frac{88}{2}$

$\sqrt{(x+5)^2} = \pm\sqrt{44}$

$x + 5 = \pm\sqrt{44}$

$-5 \quad -5$

2 | 22
2 | 11

$x = -5 \pm 2\sqrt{11}$

c) $x^2 - 24 = 40$

$+24 \quad +24$

$\sqrt{x^2} = \pm\sqrt{64}$

$x = \pm 8$

d) $\sqrt{(x-10)^2} = \pm\sqrt{144}$

$x - 10 = \pm 12$

$+10 \quad +10$

$x = 10 \pm 12$

3. Solve each equation completing the square.

a) $x^2 + 12x - 5 = 0$

$x^2 + 12x + \underline{36} - 5 - \underline{36} = 0$

$(x+6)^2 - 41 = 0$

$+41 \quad +41$

$\sqrt{(x+6)^2} = \pm\sqrt{41}$

$x + 6 = \pm\sqrt{41}$

$-6 \quad -6$

$\boxed{x = -6 \pm \sqrt{41}}$

b) $x^2 - 2x = 17$

$-17 \quad -17$

$x^2 - 2x - 17 = 0$

$x^2 - 2x + \underline{1} - 17 - \underline{1} = 0$

$(x-1)^2 - 18 = 0$

$+18 \quad +18$

$\sqrt{(x-1)^2} = \pm\sqrt{18}$

$x - 1 = \pm 3\sqrt{2}$

$+1 \quad +1$

$\boxed{x = 1 \pm 3\sqrt{2}}$

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

$x^2 + 10x + \underline{25} + 16 - \underline{25} = 0$

$(x+5)^2 - 9 = 0$

$+9 \quad +9$

$\sqrt{(x+5)^2} = \pm\sqrt{9}$

$x + 5 = \pm 3$

$-5 \quad -5$

$x = -5 \pm 3$

$= -5 + 3 = -2$

$= -5 - 3 = -8$

d) $x^2 = 8x - 18$

$-8x \quad +18$

$-8x + 18$

$x^2 - 8x + 18 = 0$

$x^2 - 8x + \underline{16} + 18 - \underline{16} = 0$

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

$-2 \quad -2$

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

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

$+4 \quad +4$

$\boxed{x = 4 \pm i\sqrt{2}}$

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

a) $x^2 + 6x = 0$

$c=0$	$b=6$
$0 \cdot 6$	6

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

$x=0 \quad x=-6$

b) $2x^2 + 7x + 3 = 0$

$a \cdot c=6$	$b=7$
$6 \cdot 1$	7

$(2x+1)(x+3)=0$

$x=-1/2$

$x=-3$

	x	$+3$
$2x$	$2x^2$	$6x$
$+1$	$1x$	3

c) $x^2 - 25 = 0$

$c=-25$	$b=0$
$-5 \cdot 5$	0

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

$x=5 \quad x=-5$

d) $x^2 + 14x = -33$

$x^2+14x+33=0$

$c=33$	$b=14$
$3 \cdot 11$	14

$(x+3)(x+11)=0$

$x=-3 \quad x=-11$

e) $x^2 - 10x + 21 = 0$

$c=21$	$b=-10$
$-7 \cdot -3$	-10

$(x-7)(x-3)=0$

$x=7 \quad x=3$

f) $3x^2 = 14x + 5$

$-14x \quad -14x - 5$

-5

$3x^2 - 14x - 5 = 0$

$a \cdot c=-15$	$b=-14$
$-15 \cdot 1$	-14

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

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

	x	-5
$3x$	$3x^2$	$-15x$
$+1$	$1x$	-5

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

a) $2x^2 + 3x - 4 = 0$

$a = 2$
$b = 3$
$c = -4$

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

$$x = \frac{-3 \pm \sqrt{41}}{4}$$

b) $3x^2 + 13x = 56$

$3x^2 + 13x - 56 = 0$

$a = 3$
$b = 13$
$c = -56$

$$x = \frac{-(13) \pm \sqrt{(13)^2 - 4(3)(-56)}}{2(3)}$$

$$x = \frac{-13 \pm \sqrt{841}}{6}$$

$$x = \frac{-13 \pm 29}{6}$$

$$= \frac{-13 + 29}{6} = \frac{16}{6} = \frac{8}{3}$$

$$= \frac{-13 - 29}{6} = -7$$

c) $x^2 + 10x = -1$

$x^2 + 10x + 1 = 0$

$a = 1$
$b = 10$
$c = 1$

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

$$x = \frac{-10 \pm \sqrt{96}}{2}$$

$$x = \frac{-10 \pm 4\sqrt{6}}{2}$$

$$x = -5 \pm 2\sqrt{6}$$

d) $x^2 + 2x + 10 = 0$

$a = 1$
$b = 2$
$c = 10$

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

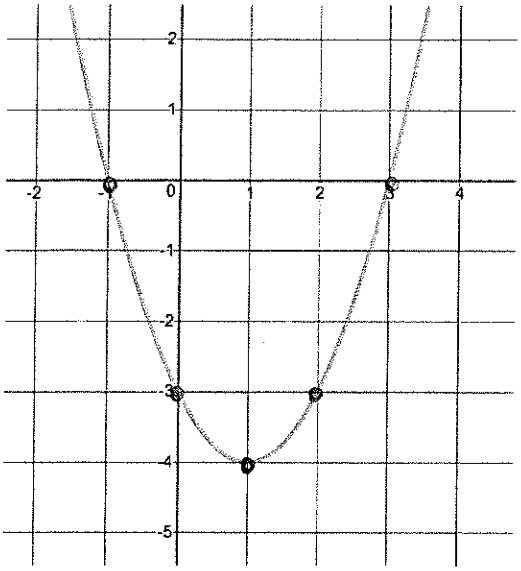
$$x = \frac{-2 \pm \sqrt{-36}}{2}$$

$$x = \frac{-2 \pm 6i}{2}$$

$$x = -1 \pm 3i$$

6. Write the equation for each graph 3 different way, if possible. Use Standard Form, Vertex Form, and Factored Form. Then state the x-intercepts

a)



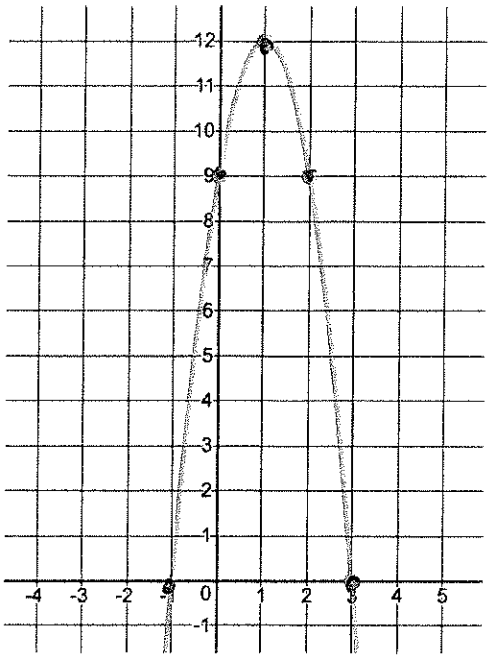
S: $y = 1x^2 - 2x - 3$

V: $y = 1(x-1)^2 - 4$

F: $y = 1(x+1)(x-3)$

x-intercepts: $(-1,0)$ and $(3,0)$

b) Hint: The A-value is not 1



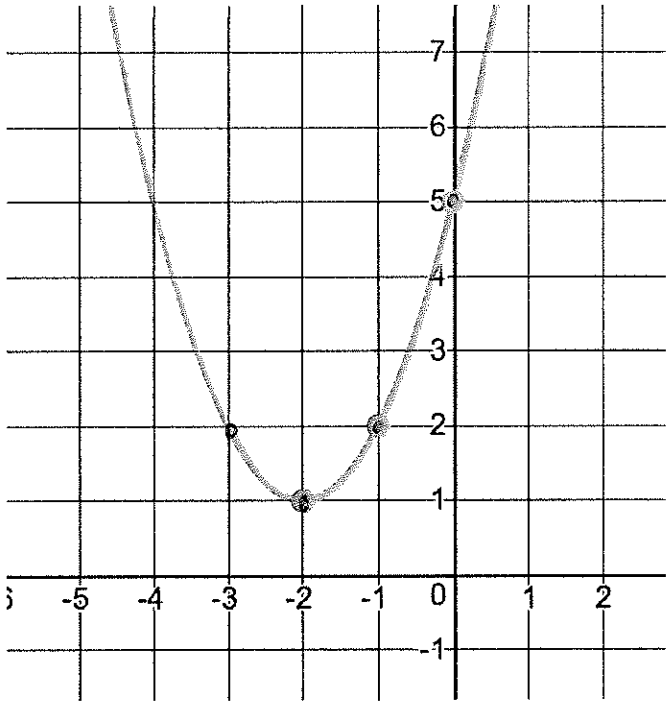
S: $y = -3x^2 + 6x + 9$

V: $y = -3(x-1)^2 + 12$

F: $y = -3(x+1)(x-3)$

x-intercepts: $(-1,0)$ and $(3,0)$

c)



S: $y = x^2 + 4x + 5$

F: $y = 1(x + 2 + i)(x + 2 - i)$

V: $y = 1(x + 2)^2 + 1$

x-intercepts:

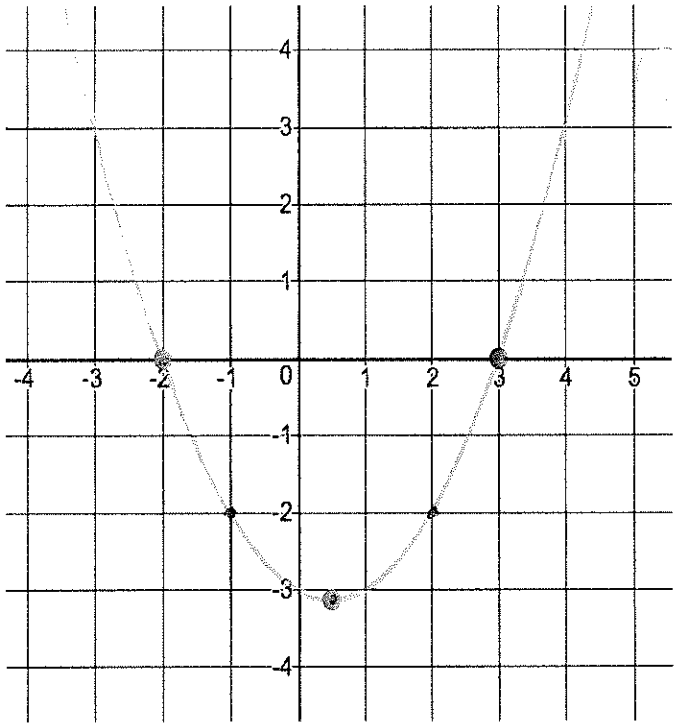
$a = 1$, $b = 4$, $c = 5$

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

$$x = \frac{-4 \pm 2i}{2}$$

$$\boxed{x = -2 \pm i}$$

d) (Hint: the A value is less than 1)



S: $y = \frac{1}{2}x^2 - \frac{1}{2}x - 3$

F: $y = \frac{1}{2}(x + 2)(x - 3)$

V: $y = \frac{1}{2}(x - 1/2)^2 - 25/8$

or $y = 0.5(x - 0.5)^2 - 3.125$

x-intercepts: $(-2, 0)$ and $(3, 0)$

find a: $y = a(x + 2)(x - 3)$

(pick a pt) $(-1, -2)$

$-2 = a(-1 + 2)(-1 - 3)$

$-2 = a(1)(-4)$

$\frac{-2}{-4} = \frac{-4a}{-4}$ $\quad a = 1/2$