Name: _____

Unit 2B Test Review: Solving Quadratics

Part 1: Simplifying Square Roots and Imaginaries

1. Simplify: $\sqrt{54}$ $\pm 3\sqrt{6}$

2. Simplify: $\sqrt{90}$ $\pm 3\sqrt{10}$

3. Simplify: $\sqrt{-64}$ $\pm 8i$

4. Simplify: $\sqrt{-48}$ $\pm 4i\sqrt{3}$

Part 2: Solving for x

5. a) What are the three algebraic methods you could use to solve a quadratic? Square Root method, Quadratic Formula, Factoring

b) Of the three methods, which would work for the equation $y = x^2 + 10$? QF, SRM

c) Which would not work? Factoring → can't multiply to 10 but add to 0.

d) Solve for x using the method of your choice.

$x =$ $i\sqrt{10}$, $x =$ $-i\sqrt{10}$

e) What options do you have to check these answers to make sure they are correct?

* plug values into equation to see if they equal 0.

6. What are the x-intercepts of the parabola $y = 2x^2 + x - 1$? $(1/2, 0)$ $(-1, 0)$

7. Solve the following quadratic: $2x^2 - 30 = 0$

$X = \sqrt{15}$ or $X = -\sqrt{15}$

8. Solve the following quadratic: $x^2 + 6x = -3$

$X = -3 + \sqrt{6}$ $X = -3 - \sqrt{6}$

9. Solve the following quadratic: $3 - 4x + 5x^2 = 0$

$X = \frac{2 - i\sqrt{10}}{5}$ $X = \frac{2 + i\sqrt{10}}{5}$

Part 3: Complete the Square!

10. What is the vertex form of the equation $y = x^2 + 10x + 7$? $y = (x+5)^2 - 18$

11. What is the vertex form of the equation $y = x^2 - 22x + 4$? $y = (x-11)^2 - 117$

12. What is the vertex of the parabola given by $y = x^2 + 8x - 5$? $(-4, -21)$

Part 4: Summary of Quadratics

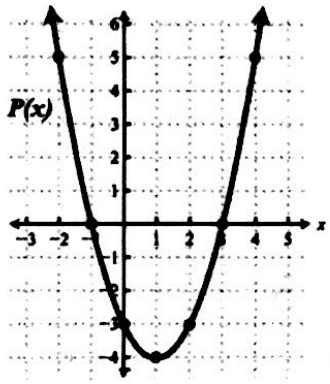
13. Given the equation $y = x^2 - 10x + 16$…

a) Find the x-intercepts of the graph. $x =$ 8, $x =$ 2

b) Rewrite the equation in vertex form by completing the square. $y =$ $(x-5)^2 - 9$

c) What is the vertex of the graph? (5, -9)

14. Write two equations for the parabola below - one in vertex form and one in factored form.



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

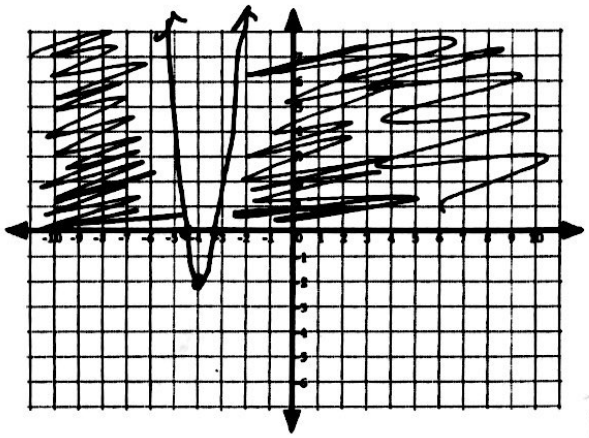
Factored (intercept) form: $y =$ $(x+1)(x-3)$

15. How many solutions should the following system have? What are the solutions? Record your answers as a point.

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

2 solutions. Solutions: $\left(\frac{3-\sqrt{5}}{2}, \frac{5+\sqrt{5}}{2}\right)$, $\left(\frac{3+\sqrt{5}}{2}, \frac{5-\sqrt{5}}{2}\right)$

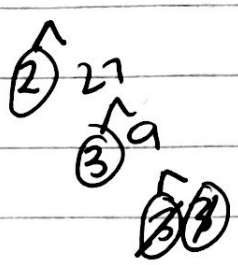
16. Solve the inequality: $0 \leq 4x^2 + 32x + 62$



Not a pretty problem! Sorry!!

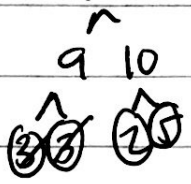
$x < \frac{-8-\sqrt{2}}{2}$ OR $x > \frac{-8+\sqrt{2}}{2}$

① 54



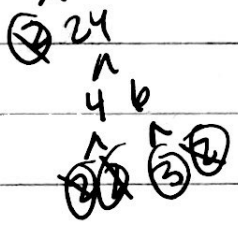
$3\sqrt{2 \cdot 3} = \pm 3\sqrt{6}$

② 90



$3\sqrt{2 \cdot 5} = \pm 3\sqrt{10}$

③ 48



$2 \cdot 2\sqrt{3} = \pm 4i\sqrt{3}$

But there is a negative so i is added

⑤ $y = x^2 + 10$

$0 = x^2 + 10$

$\sqrt{-10} = \sqrt{x^2}$

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

b. $y = 2x^2 + x - 1$

+1	-2
$2 \cdot -1$ ✓	$2 \cdot -1$ ✓

$2x^2 + 2x - 1x - 1$

$2x(x+1) - 1(x+1)$

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

$2x - 1 = 0$ $\quad$ $x + 1 = 0$

$2x = 1$ $\quad$ $x = -1$

$x = 1/2$

(7) $2x^2 - 30 = 0$

$2x^2 = 30$

$x^2 = 15$

$x = \pm\sqrt{15}$

(8) $x^2 + 6x = -3$ $\quad$ $a = 1$ $\quad$ $b = 6$ $\quad$ $c = 3$

$x^2 + 6x + 3 = 0$

$$x = \frac{-(6) \pm \sqrt{(6)^2 - 4(1)(3)}}{2(1)} = \frac{-6 \pm \sqrt{24}}{2}$$

24
6 4
3 2 2 2

$$= \frac{-6 \pm 2\sqrt{6}}{2} = \boxed{-3 \pm \sqrt{6}}$$

(9) $3-4x+5x^2=0$

$a=5 \quad b=-4 \quad c=3$

$5x^2-4x+3=0$

$$x=\frac{-(-4)\pm\sqrt{(-4)^2-4(5)(3)}}{2(5)}=\frac{4\pm\sqrt{-44}}{10}$$

44
2 10
2 2 5 2

$$=\frac{4\pm 2i\sqrt{10}}{10}=\boxed{\frac{2\pm i\sqrt{10}}{5}}$$

(10) $y=x^2+10x+7$

$10/2=5 \rightarrow (5)^2=25$

$y=(x^2+10x+25)+7-25$

$y=(x+5)^2-18$

(11) $y=x^2-22x+4$

$-22/2=-11 \rightarrow (-11)^2=121$

$y=(x^2-22x+121)+4-121$

$\boxed{y=(x-11)^2-117}$

(12) $y = x^2 + 8x - 5$

$8/2 = 4 \rightarrow 4^2 = 16$

$y = (x^2 + 8x + 16) - 5 - 16$

$y = (x+4)^2 - 21$

opp

Vertex: $(-4, -21)$

(13.) $y = x^2 - 10x + 16$

$+(-10)$	16
$-8-2$ ✓	$-8 \cdot -2$ ✓

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

$x-8=0 \quad x-2=0$

$x=8 \quad x=2$

Complete the □

$y = x^2 - 10x + 16$

$-10/2 = -5 \rightarrow (-5)^2 = 25$

$y = (x^2 - 10x + 25) + 16 - 25$

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

opp

Vertex: $(5, -9)$

(14) Vertex : $(1, -4)$
x intercepts : $(-1, 0)$ $(3, 0)$

Vertex Form: $y = (x-1)^2 - 4$
↑ sign of x flips

Intercept Form: $y = (x+1)(x-3)$
↑
sign of x flips

(15) $y = x^2 - 2x + 2$
$y = x + 1$

$x^2 - 2x + 2 = x + 1$
$-x \quad -1 \quad -x \quad -1$

$x^2 - 3x + 1 = 0$

$a = 1 \quad b = -3 \quad c = 1$

$x = \dfrac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(1)}}{2(1)}$

$x = \dfrac{3 \pm \sqrt{5}}{2}$

$x = \dfrac{3+\sqrt{5}}{2}$ or $x = \dfrac{3-\sqrt{5}}{2}$

To get y, plug into original equation!

$y = \left(\dfrac{3+\sqrt{5}}{2}\right) + 1$ $\quad$ $y = \left(\dfrac{3-\sqrt{5}}{2}\right) + 1$

$y = \dfrac{5+\sqrt{5}}{2}$ $\quad$ $y = \dfrac{5-\sqrt{5}}{2}$

Solution: $\left(\dfrac{3+\sqrt{5}}{2}, \dfrac{5+\sqrt{5}}{2}\right)$ and $\left(\dfrac{3-\sqrt{5}}{2}, \dfrac{5-\sqrt{5}}{2}\right)$

(16) $0 \leq 4x^2 + 32x + 62$

$a = 4 \quad b = 32 \quad c = 62$

$$x = \frac{-(32) \pm \sqrt{(32)^2 - 4(4)(62)}}{2(4)}$$

$$x = \frac{-32 \pm \sqrt{32}}{8} = \frac{-32 \pm 4\sqrt{2}}{8}$$

$$= \frac{-8 \pm \sqrt{2}}{2}$$

X intercepts: $\left(\frac{-8-\sqrt{2}}{2}, 0\right)\left(\frac{-8+\sqrt{2}}{2}, 0\right)$