Name: _____

Advanced Algebra 2

Date: _____ Period: _____

4.5-4.6 Quiz Review

Solve the following equations by factoring.

1. $x^2 - 2x - 24 = 0$

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

$x-6=0 \quad x+4=0$

$x = 6, -4$

2. $3x^2 = x + 4$

$\qquad -12$

$3x^2 - x - 4 = 0 \qquad -4, 3$

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

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

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

$x = \frac{4}{3}, -1$

3. $x^2 - 6x + 9 = 0$

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

$x = 3$

4. $3x^2 + 45 = 24x$

$3x^2 - 24x + 45 = 0$

$3(x^2 - 8x + 15) = 0$

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

$x = 5, 3$

5. $4x^2 + 6x = 0$

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

$2x = 0 \quad 2x+3=0$

$x = 0, -\frac{3}{2}$

6. $12x^2 - x - 1 = 0$

$\qquad -12$

$12x^2 - 4x + 3x - 1 = 0 \quad -4, 3$

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

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

$x = -\frac{1}{4}, \frac{1}{3}$

Solve the following by graphing on a graphing calculator. Round to the nearest thousandth.

7. $\frac{2}{3}x^2 + 3x - 6 = -2x$

$x = -8.552, 1.052$

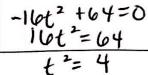8. $-3x^2 - 2x = -2$

$x = -1.215, 0.549$

9. A woman drops a front door key to her husband from their apartment window several stories above the ground. The function $h = -16t^2 + 64$ gives the height h of the key in feet, t seconds after she releases it.
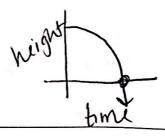
   a. What is the height of the key before it is released?

   $t = 0 \qquad height = 64 \; feet$

   b. How long does it take the key to reach the ground?

   $-16t^2 + 64 = 0$

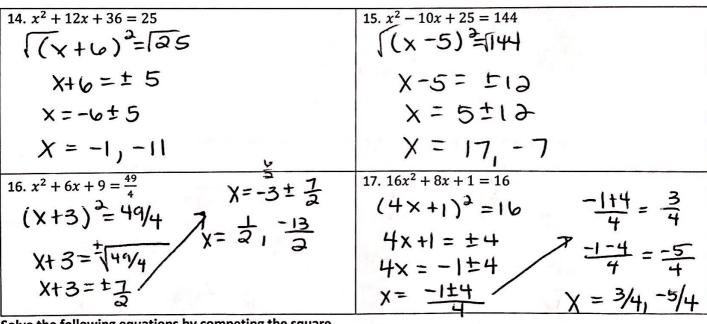 $16t^2 = 64 \qquad 2 \; seconds$

   $t^2 = 4$

   $t = \pm 2$

Solve the following equations by finding square roots. Simplify all irrational answers.

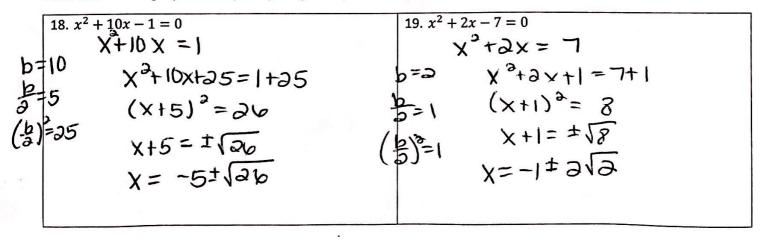| 10. $3x^2 = 75$	11. $5x^2 - 45 = 0$	12. $4x^2 - 49 = 0$
$x^2 = 25$ $x = \pm\sqrt{25}$ $x = \pm 5$	$5x^2 = 45$ $x^2 = 9$ $x = \pm\sqrt{9}$ $x = \pm 3$	$4x^2 = 49$ $x^2 = \dfrac{49}{4}$ $x = \pm\sqrt{\dfrac{49}{4}}$ $x = \pm 7/2$

13. A box is 4 in. high. Its length is 1.5 times its width. The volume of the box is 1350 in². What are the width and length of the box?

$1.5x \qquad x \qquad\qquad V = LWH \qquad W = 15$ in

$1350 = 4(1.5x)(x)$

$\dfrac{1350}{6} = \dfrac{6x^2}{6} \qquad\qquad x = \sqrt{225} \qquad L = 22.5$ in

$225 = x^2 \qquad\qquad x = 15$

$15(1.5) = 22.5$

Solve the following equations by factoring the left side of the equations.

14. $x^2 + 12x + 36 = 25$	15. $x^2 - 10x + 25 = 144$
$\sqrt{(x+6)^2} = \sqrt{25}$ $x + 6 = \pm 5$ $x = -6 \pm 5$ $x = -1, -11$	$\sqrt{(x-5)^2} = \sqrt{144}$ $x - 5 = \pm 12$ $x = 5 \pm 12$ $x = 17, -7$

16. $x^2 + 6x + 9 = \dfrac{49}{4}$	$x = -3 \pm \dfrac{7}{2}$	17. $16x^2 + 8x + 1 = 16$	$\dfrac{-1+4}{4} = \dfrac{3}{4}$
$(x+3)^2 = 49/4$ $x + 3 = \pm\sqrt{49/4}$ $x + 3 = \pm\dfrac{7}{2}$	$x = \dfrac{1}{2}, \dfrac{-13}{2}$	$(4x+1)^2 = 16$ $4x + 1 = \pm 4$ $4x = -1 \pm 4$ $x = \dfrac{-1 \pm 4}{4}$	$\dfrac{-1-4}{4} = \dfrac{-5}{4}$ $x = 3/4, -5/4$

Solve the following equations by competing the square.

18. $x^2 + 10x - 1 = 0$	19. $x^2 + 2x - 7 = 0$
$b = 10$ $\dfrac{b}{2} = 5$ $\left(\dfrac{b}{2}\right)^2 = 25$ $x^2 + 10x = 1$ $x^2 + 10x + 25 = 1 + 25$ $(x+5)^2 = 26$ $x + 5 = \pm\sqrt{26}$ $x = -5 \pm\sqrt{26}$	$b = 2$ $\dfrac{b}{2} = 1$ $\left(\dfrac{b}{2}\right)^2 = 1$ $x^2 + 2x = 7$ $x^2 + 2x + 1 = 7 + 1$ $(x+1)^2 = 8$ $x + 1 = \pm\sqrt{8}$ $x = -1 \pm 2\sqrt{2}$

20. $4x^2 + 20x + 1 = 0$

$b = \frac{5}{2}$

$\frac{b}{2} = \frac{5}{2}$

$\left(\frac{b}{2}\right)^2 = \frac{25}{4}$

$$\frac{4x^2}{4} + \frac{20x}{4} = \frac{-1}{4}$$

$$x^2 + 5x = \frac{-1}{4}$$

$$\left(x^2 + 5x + \frac{25}{4}\right) = \frac{-1}{4} + \frac{25}{4}$$

$$\left(x + \frac{5}{2}\right)^2 = 6$$

$$x + \frac{5}{2} = \pm\sqrt{6}$$

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

21. $3x^2 + 4x = 2x^2 + 3$

$b = 4$

$b/2 = 2$

$(b/2)^2 = 4$

$$x^2 + 4x = 3$$

$$x^2 + 4x + 4 = 3 + 4$$

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

$$x + 2 = \pm\sqrt{7}$$

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

Rewrite the following equations in vertex form by completing the square.

22. $y = x^2 - 6x + 4$

$b = -6$

$\frac{b}{2} = -3$

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

$$y = x^2 - 6x + \boxed{9} + 4 - \boxed{9}$$

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

23. $y = x^2 + 14x + 50$

$b = 14$

$\frac{b}{2} = 7$

$\left(\frac{b}{2}\right)^2 = 49$

$$y = x^2 + 14x + \boxed{49} + 50 - \boxed{49}$$

$$y = (x+7)^2 + 1$$

24. $\frac{y}{2} = \frac{2x^2}{2} + \frac{8x}{2} + \frac{2}{2}$

$b = 4$

$\frac{b}{2} = 2$

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

$$\frac{y}{2} = x^2 + 4x + \boxed{4} + 1 - \boxed{4}$$

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

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

25. $\frac{y}{-2} = \frac{-2x^2}{-2} + \frac{6x}{-2} - \frac{2}{-2}$

$b = -3$

$\frac{b}{2} = \frac{-3}{2}$

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

$$\frac{y}{-2} = x^2 - 3x + \boxed{9/4} + 1 - \boxed{9/4}$$

$$\frac{y}{-2} = \left(x - \frac{3}{2}\right)^2 - \frac{5}{4}$$

$$y = -2\left(x - \frac{3}{2}\right)^2 + \frac{5}{2}$$

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