Transitions to College Math
4.2 Review

Name: Key
Date: _____ Period: ____

SHOW ALL WORK!

1. Write the quadratic formula.

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

2. Write the discriminant of the quadratic formula.

b^2-4ac

Fill in the Blanks.

3. When the discriminant is positive, your solution will contain 2 real roots.

4. When the discriminant is zero, your solution will contain 1 real double root.

5. When the discriminant is negative, your solution will contain 2 imaginary roots.

6. Solve by *factoring.*

$$2x^2 - 5x = 12$$

$2x^2-5x-12=0$

$(2x+3)(x-4)=0$

$2x+3=0$ $\quad$ $x-4=0$

$2x=-3$ $\quad$ $x=4$

$x=-3/2$

7. Solve by using the *square root property.*

$\sqrt{(x+1)^2} = \sqrt{48}$

$x+1 = \pm\sqrt{48}$

$x = -1 \pm 4\sqrt{3}$

48 → 4, 12 → 4, 3

8. Solve by *completing the square.*

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

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

$x^2-2x+1 = 6+1$

$\sqrt{(x-1)^2} = \sqrt{7}$

$x-1 = \pm\sqrt{7}$

$x = 1 \pm \sqrt{7}$

9. Solve by using the method of your choice.

$$x^2 = 3x+5$$

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

$(-\frac{3}{2})^2 = \frac{9}{4}$

$x^2-3x+\frac{9}{4} = 5+\frac{9}{4}$

$\sqrt{(x-3/2)^2} = \sqrt{\frac{20}{4}+\frac{9}{4}}$

$x-3/2 = \pm\sqrt{29/4}$

$x = \frac{3}{2} \pm \frac{\sqrt{29}}{2}$

$x = \frac{3 \pm \sqrt{29}}{2}$

Complete the Square Method

Quadratic Formula Method

$x = \frac{3 \pm \sqrt{9-4(1)(-5)}}{2}$

$x = \frac{3 \pm \sqrt{29}}{2}$

10. Write an equation AND solve.

The sum of a number and its reciprocal is $\frac{13}{6}$. *Find the numbers.*

$6x \cdot x + \frac{1}{x} = \frac{13}{6} \cdot 6x$

$6x^2 + 6 = 13x$

$6x^2 - 13x + 6 = 0$

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

$x = 2/3, 3/2$

11. One pipe can fill a tank in 5 hours less than another. Together they can fill the tank in 5 hours. How long would each to fill the tank alone? (Round your answer to the nearest tenth).

	WR	T	WD
Pipe 1	$1/x$	5	$5/x$
Pipe 2	$1/x-5$	5	$5/x-5$

$x(x-5) \cdot \frac{5}{x} + \frac{5}{x-5} = 1 \cdot x(x-5)$

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

$5x - 25 + 5x = x^2 - 5x$

$0 = x^2 - 15x + 25$

$x = \frac{15 \pm \sqrt{225 - 4(1)(25)}}{2}$

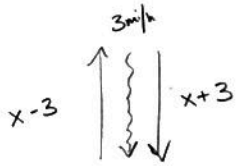
$x = \frac{15 \pm \sqrt{125}}{2}$

$x = \frac{15 \pm 5\sqrt{5}}{2}$

$x = \frac{15 + 5\sqrt{5}}{2} =$ 13.1 hours

~~$\frac{15 - 5\sqrt{5}}{2} = 1.9$~~ 8.1 hours

12. A boater travels 36 miles upstream against a 3 mi/h current, then returns downstream to the starting point. If the entire trip took 5 hours, what is the rate of the boat in still water?



	R	T	D
Upstream	$x-3$	t	36
Downstream	$x+3$	$5-t$	36

$(x-3)t = 36$

$t = \frac{36}{x-3}$

$(x+3)(5-t) = 36$

$5 - t = \frac{36}{x+3}$

$5 - \frac{36}{x+3} = t$

$(x-3)(x+3) \cdot \frac{36}{x-3} = 5 - \frac{36}{x+3} \cdot (x-3)(x+3)$

$36(x+3) = 5(x-3)(x+3) - 36(x-3)$

$36x + 108 = 5(x^2 - 9) - 36x + 108$

$0 = 5x^2 - 45 - 72x$

$0 = 5x^2 - 72x + 45$

$0 = (5x + 3)(x - 15)$

$x = -3/5 \quad x = 15$

The rate of the boat is 15mph