Name:_____ Date:_____

Pre Calculus 11 HW: Lesson 6 Completing the Square

1. What is a perfect trinomial? Explain using your own words? How do you tell if a trinomial is a perfect trinomial?

2. Which of the following are perfect trinomials? Indicate YES or NO I(If not, explain why If yes, factor it.

a) $y = x^2 + 12x + 36$	b) $y = x^2 + 10x - 25$	c) $y = x^2 - 14x + 49$
d) $y = x^2 - 20x - 100$	e) $y = x^2 + 22x + 121$	f) $y = x^2 - 40x + 400$
g) $y = 4x^2 - 4x + 1$	h) $y = 4x^2 - 9$	i) $y = 25x^2 - 20x + 4$

3. What does it mean to complete the square? Explain:

4. Indicate what value should be added to the trinomial so that the equation could be a perfect trinomial:

a) $x^2 + (?) + 9$	b) $x^2 + 8x + (?)$
c) $(?) - 2x + 1$	d) $x^2 - (?) + 81$
e) $x^2 - 15x + (?)$	f) $x^2 + 17x + (?)$
g) $4x^2 + 4x + (?)$	h) $9x^2 - (?) + 1$

5. What are the first two steps in the process of completing the square?

6. What is $12 \div \left(-\frac{1}{2} \right)$? What happens when you divide a value by a fraction?

7. Convert each equation in to vertex form: $y = a\left(x - p\right)^2 + q$ by completing the square. Show all your steps:

a) $y = x^2 + 4x - 20$ *Equation*:	b) $y = x^2 - 8x - 20$ *Equation*:
c) $y = -x^2 - 14x - 15$ *Equation*:	d) $y = 4x^2 + 20x - 12$ *Equation*:

e) $y=2x(x-5)$ *Equation*:	f) $y=3x^2+6x+10$ *Equation*:
g) $y=-2x^2-15x+100$ *Equation*:	h) $y=-3x^2+18x+50$ *Equation*:
e) $y=-\frac{1}{2}x^2+14x+100$ *Equation*:	f) $y=\frac{1}{2}x^2+8x-30$ *Equation*:

8. Solve each of the following equations algebraically:

a) $(x-3)^2-12=0$	b) $(2x+4)^2-16=0$	c) $-4(x+7)^2+14=0$
d) $0.5(x+11)^2-11=0$	e) $(x+5)^2+12=0$	f) $\frac{(2x+1)^2}{3}-15=0$
g) $-\frac{2}{3}\left(x-\frac{3}{2}\right)^2+4=0$	h) $-\frac{7}{3}(2x-13)^2+15=0$	i) $\frac{17}{3}(2x-21)^2=0$

9.

10. Given a quadratic function in the form of $y=a(x-p)^2+q$:

    a. If $a>0$ and $q>0$, then the function will not have any roots: TRUE or FALLSE (Explain)

    b. If $a<0$ and $q>0$, then the function will have only one root: TRUE or FALLSE (Explain)

c. If $a < 0$ and $p < 0$, then the function will at least one root: TRUE or FALLSE (Explain)

d. If $a \times q < 0$ then the function will have two roots: TRUE or FALLSE (Explain)

11. 3 tried to convert a quadratic function from general form to vertex form by completing the square. Review each step and indicate if there are any errors in the process:

a) student #1	b) Student #2
$step\ 1: \quad y = 3x^2 - 6x + 10$ $step\ 2: \quad y = (3x^2 - 6x) + 10$ $step\ 3: \quad y = 3x(x-2) + 10$ $step\ 4: \quad y = 3(x-2)^2 + 10$	$Stept\ 1: y = -2x^2 + 20x - 3$ $Stept\ 2: y = (-2x^2 + 20x) - 3$ $Stept\ 3: y = -2(x^2 + 10x) - 3$ $Stept\ 4: y = -2(x^2 + 10x + 25 - 25) - 3$ $Stept\ 5: y = -2(x+5)^2 + 50 - 3$ $Stept\ 6: y = -2(x+5)^2 + 47$
c) Student #3	d) Student #4
$Stept\ 1: y = -\frac{1}{2}x^2 + 4x + 5$ $Stept\ 2: y = \left(-\frac{1}{2}x^2 + 4x\right) + 5$ $Stept\ 3: y = -\frac{1}{2}(x^2 - 2x) + 5$ $Stept\ 4: y = -\frac{1}{2}(x^2 - 2x + 1 - 1) + 5$ $Stept\ 5: y = -\frac{1}{2}(x-1)^2 + 1 + 5$ $Stept\ 6: y = -\frac{1}{2}(x-1)^2 + 6$	$Stept\ 1: y = \frac{2}{3}x^2 + 8x + 10$ $Stept\ 2: y = \left(\frac{2}{3}x^2 + 8x\right) + 10$ $Stept\ 3: y = \frac{2}{3}(x^2 + 12x) + 10$ $Stept\ 4: y = \frac{2}{3}(x^2 + 12x + 36 - 36) + 10$ $Stept\ 5: y = \frac{2}{3}(x+6)^2 + 24 + 10$ $Stept\ 6: y = \frac{2}{3}(x+6)^2 + 34$