Algebra 2

NAME **Key**

Quadratics Part 2 Review

DATE_____

1. Simplify each of the following:
   a. $(2 + 7i) - (-3 - 2i)$

   $$5 + 9i$$

   b. $(3 + 10i)(-4 - 8i)$

   $$-12 - 24i - 40i - 80i^2$$
   $$-12 - 64i + 80$$
   $$68 - 64i$$

   c. $(1 + 6i)(1 - 6i)$

   $$1 - 36i^2$$

   $$37$$

2. Solve algebraically: $\sqrt{5 - x} + 3 = x$

   $$\sqrt{5-x} = x - 3$$
   $$5 - x = (x-3)^2$$
   $$5 - x = x^2 - 6x + 9$$
   $$0 = x^2 - 5x + 4$$
   $$0 = (x-4)(x-1)$$

   $x - 4 = 0$ $x - 1 = 0$
   $\boxed{x = 4}$ $\cancel{x = 1}$

   Check:
   $\sqrt{5-4} + 3 = 4$ $\boxed{x = 4}$
   $4 = 4$ ✓
   $\sqrt{5-1} + 3 = 1$
   $2 + 3 \neq 1$

3. A pelican flying in the air over water drops a crab from a height of 30 feet. The distance the crab is from the water as it falls can be represented by the function $h(t) = -16t^2 + 30$, where t is time, in seconds. To catch the crab as it falls, a gull flies along a path represented by the function $g(t) = -8t + 15$. Can the gull catch the crab before the crab hits the water? Justify your answer algebraically.

   $$-16t^2 + 30 = -8t + 15$$
   $$-16t^2 + 8t + 15 = 0$$

   $$t = \frac{-8}{2(-16)} \pm \frac{\sqrt{8^2 - 4(-16)(15)}}{2(-16)}$$

   $$t = .25 \pm \frac{\sqrt{1024}}{-32}$$

   $$t = -.75 \text{ (does not make sense)}$$
   $$t = 1.25$$

   Yes, at 1.25 seconds the gull will catch the crab.

4. Solve algebraically: $x - \dfrac{10}{x} + 3 = 0$

$$x \cdot x - \frac{10}{x} \cdot x + 3 \cdot x = 0$$

$$x^2 - 10 + 3x = 0$$

$$x^2 + 3x - 10 = 0$$

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

$$x + 5 = 0 \qquad x - 2 = 0$$

$$\boxed{x = -5 \qquad x = 2}$$

check:

$$-5 - \frac{10}{-5} + 3 = 0$$

$$-5 + 2 + 3 = 0$$

$$0 = 0$$

$$2 - \frac{10}{2} + 3 = 0$$

$$2 - 5 + 3 = 0$$

$$0 = 0$$

5. Find the equation of the parabola whose focus is (4, 2) and directrix is $x = 2$.

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

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

$$x^2 - 8x + 16 + y^2 - 4y + 4 = x^2 - 4x + 4$$

$$y^2 - 4y + 16 = 4x$$

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

6. Solve algebraically: $\sqrt[3]{4x + 28} + 8 = 12$

$$\sqrt[3]{4x + 28} = 4$$

$$4x + 28 = 64$$

$$4x = 36$$

$$\boxed{x = 9}$$

$$\sqrt[3]{4(9) + 28} + 8 = 12$$

$$\sqrt[3]{64} + 8 = 12$$

$$4 + 8 = 12$$

$$12 = 12 \checkmark$$