*AAT

**Chapter 2: Complex Numbers Practice (IC)**

Name: Key

Date: ______ Period: ______

Determine the imaginary roots of each equation by either using the quadratic formula or completing the square. Write all complex roots in standard form.

1. $y = x^2 + 5$

$$x = \frac{-0 \pm \sqrt{0^2 - 4(1)(5)}}{2(1)}$$

$$x = \frac{\pm\sqrt{0-20}}{2}$$

$$x = \frac{\pm\sqrt{-20}}{2}; \quad x = \frac{\pm 2i\sqrt{5}}{2}$$

$$x = \pm i\sqrt{5}$$

2. $y = 2x^2 + 5x + 4$

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

$$= \frac{-5 \pm \sqrt{25-32}}{4}$$

$$x = \frac{-5 \pm \sqrt{-7}}{4}$$

$$x = \frac{-5 \pm i\sqrt{7}}{4}$$

3. $y = x^2 - 2x + 3$

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

$$= \frac{2 \pm \sqrt{4-12}}{2}$$

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

$$x = \frac{2 \pm 2i\sqrt{2}}{2}$$

$$x = 1 \pm i\sqrt{2}$$

Perform the indicated operation and write the final expression in the form of a+bi.

4. (3-5i) + (2+2i) $= 5 - 3i$

5. (1+2i) – (3-4i) $= -2 + 6i$

6. (5+i)(3-2i) $= 15 - 7i - 2i^2 = 17 - 7i$

7. $(2-3i)^2 = (2-3i)(2-3i) = 4-12i+9i^2 = 4-12i-9$
$= -5-12i$

8. $\frac{i}{1-i} \frac{(1+i)}{(1+i)} = \frac{i+i^2}{1-i^2} = \frac{i-1}{2}$ or $\frac{i}{2} - \frac{1}{2}$

9. $\frac{3-2i}{2+i} \frac{(2-i)}{(2-i)} = \frac{6-7i+2i^2}{4-i^2} = \frac{4-7i}{5}$ or $\frac{4}{5} - \frac{7}{5}i$