Name: _____ Date:

Course: _____ Nyack College

College Algebra

Preliminary Assessment #7

Directions: Make sure to show your work.

1. **Write each expression in the standard form $a + bi$**

   a. $(2 - 3i) + (4 - 6i)$

   b. $(5 - 4i) - (4 - 6i)$

c. $\left(\dfrac{1}{4} + \dfrac{\sqrt{5}}{2}i\right)^2$

d. $\dfrac{2-i}{-2i}$

2. Perform the indicated operations and express your answer in the "$a + bi$" form

a. $\sqrt{-16}$

b. $\sqrt{169} - \sqrt{-25}$

c. $\sqrt{(1 + 7i)(3i - 5)}$

d. $(\sqrt{-225})(\sqrt{-144})$

3. **Solve each equation in the complex number systems**

a. $x^2 + 4 = 0$

b. $x^2 + 4x + 8 = 0$

c. $x^2 - x + 1 = 0$

d. $x^4 + 13x^2 + 36 = 0$

4. **Without solving, determine the character of the solutions of each equation in the complex number system.**

   a. $2x^2 - 4x + 1 = 0$

   b. $x^2 - 2x + 6 = 0$

c. $5x^2 - 106x + 120 = 0$

d. $4x^2 + 12x + 9 = 0$