

INSTRUCTIONS: You must show enough work to justify your answer on **ALL** problems. Correct answers with no work (or inconsistent work) shown **will not** receive full credit. **All answers are to be exact; no decimal approximations.** You are **NOT** allowed to use any electronic device for this exam.

1. Simplify the following. Write your answer in $a + b i$ form. **Put a box around your answer.**

a. $(9 + 2i) + (-8 + 3i)$ (5 pts.)

b. $(4 - 3i)^2$ (5 pts.)

c. $\frac{5 - 6i}{7 - 2i}$ (8 pts.)

2. Solve the following equations by the indicated method. **Put a box around your answer(s).**

a. $9y^2 + 25 = 0$ using square roots (5 pts.)

b. $(x + 8)^2 = 49$ using square roots (5 pts.)

c. $x^2 - 4x = -20$ using the Quadratic Formula (10 pts.)

d. $2y^2 - 11y + 12 = 0$ by factoring (6 pts.)

3. Solve the following equations. **Put a box around your answer(s).**

a. $8|3t - 5| + 15 = 47$ (8 pts.)

b. $4y^3 + 3y^2 - 16y - 12 = 0$ (8 pts.)

c.
$$\frac{4x}{x-2} - \frac{3}{x+3} = \frac{3x^2 - 12}{x^2 + x - 6} \quad (10 \text{ pts.})$$

d.
$$\sqrt{x+2} - x = -4 \quad (10 \text{ pts.})$$

4. Solve the inequality $|y + 6| - 2 < 8$. Write the solution set in interval notation. (7 pts.)

Answer _____

5. Write the following as an inequality **and** in interval notation:

x is less than 8 and greater than or equal to -4 . (6 pts)

Inequality _____

Interval Notation _____

6. Emily drove from her home to the mountains last weekend. There was heavy traffic on the way there, and the trip took 8 hours. When Emily drove home, there was no traffic and the trip only took 6 hours. If her rate was 15 miles per hour faster on the trip home, how far away does Emily live from the mountains? (7 pts) **Don't forget to identify any variable(s) that you use.**

Answer _____