SHOW ALL WORK on a separate piece of paper.

Problems 1 - 6, write the expression as a complex number in standard form.

- 1. (-3-8i) + (-5-7i)
- 2. (5-2i) 2(3+i)
- 3. -i + (7 5i) 3(2 3i)
- 4. (2+3i)(1-4i)

5.
$$\frac{5}{1+i}$$

- $6. \quad \frac{8+7i}{3-4i}$
- 7. Simplify $\frac{\sqrt{6}}{4+\sqrt{2}}$.

Solve by factoring

- 8. $4x^2 12x 16 = 0$
- 9. $3x^2 = x + 14$

Solve by square roots

- 10. $3x^2 9 = 3$
- 11. $3(x-8)^2 29 = 37$

Solve by completing the square.

- 12. $36x = -4x^2 50$
- 13. $x^2 x + 2 = 0$

- Solve using the quadratic formula
- 14. $4x^2 8x + 1 = 0$
- 15. $3x^2 + x 1 = 0$

Solve using any method

- 16. $-5x^2 3x = 4$ 17. $\frac{1}{3}x^2 + 1 = 33$ 18. $x^2 + 2x = 24$
- 19. $4x^2 + 20 = 0$
- $20. \quad -3x^2 12x + 18 = 0$
- 21. $x^2 4x 2 = 0$
- 22. The height of a triangle is three feet longer than the base. The area of the triangle is 35 square feet. Find the height and base of the triangle.
- 23. A city's community garden is a rectangle 100 ft long by 50 ft wide. The city wants to triple the area of the garden by adding the same distance x to the length and the width. Write and solve an equation to find the new dimensions of the garden.
- 24. A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground *t* seconds after it is thrown is given by $d = -16t^2 - 4t + 412$. How long after the rock is thrown is it 410 feet from the ground?

SHOW ALL WORK on a separate piece of paper. Answer Section

1.
$$-8 - 15i$$

2. $-1 - 4i$
3. $1 + 3i$
4. $14 - 5i$
5. $\frac{5}{2} - \frac{5}{2}i$
6. $\frac{4}{25} + \frac{53}{25}i$
7. $\frac{2\sqrt{6} - \sqrt{3}}{7}$
8. $-1, 4$
9. $\frac{7}{3}, -2$
10. ± 2
11. $8 \pm \sqrt{22}$
12. $\frac{-9 - \sqrt{31}}{2}$ and $\frac{-9 + \sqrt{31}}{2}$
13. $\frac{1}{2} \pm i\frac{\sqrt{7}}{2}$
14. $\frac{2 - \sqrt{3}}{2}, \frac{2 + \sqrt{3}}{2}$
15. $-\frac{1}{6} \pm \frac{\sqrt{13}}{6}$
16. $\frac{-3 + i\sqrt{71}}{10}, \frac{-3 - i\sqrt{71}}{10}$
17. $\pm 4\sqrt{6}$
18. $-6, 4$
19. $\pm i\sqrt{5}$
20. $-2 + \sqrt{10}$ and $-2 - \sqrt{10}$
21. $x = 2 \pm \sqrt{6}$
22. Height: 10 ft; Base: 7 ft
23. 100 ft by 150 ft
24. $\frac{1}{4}$ sec