1. Write each number as a product of a real number and $i$.
   a) $\sqrt{-108}$
   b) $-\sqrt{-80}$

2. Write $\frac{10 + \sqrt{-200}}{15}$ in the standard form $a + bi$

3. Find the sum or difference. Write each answer in the standard form $a + bi$.
   a) $(2 - 3i) - (5 - 7i) + (8 + 4i)$
   b) $3 - (4 - i) - 4i + 2(3 - 7i)$

4. Find the product. Write each answer in the standard form $a + bi$.
   a) $(7 + 3i)(5 - 7i)$
   b) $(5 - 3i)^2$

5. Find the quotient. Write each answer in the standard form $a + bi$.
   a) $\frac{-3 + 4i}{2 - i}$
   b) $\frac{6 + i}{7 + 3i}$

6. Find each power of $i$.
   a. $i^{14}$
   b. $i^{37}$

7. Solve by factoring: $4x^2 - 13x = -3$

In problems 8 & 9, solve each equation by the square root method.
8. $(2x + 8)^2 = 27$
9. $(x - 5)^2 = -18$

In problems 10 & 11, solve each equation by completing the square.
10. $x^2 - 8x - 3 = 0$
11. $3x^2 + 7x - 4 = 0$

12. Solve using the quadratic formula: $\frac{2}{3}x^2 + \frac{1}{4}x = 3$

In problems 13-15, solve the following application problems:

13. The sum of the squares of two consecutive even integers is 52. Find the integers.

14. The lengths of the sides of a right triangle are such that the shortest side is 7 inch shorter than the middle side, while the longest side (the hypotenuse) is 1 inch longer than the middle side. Find the lengths of the three sides.
15. A boat is being pulled into a dock with a rope attached to the boat at water level. When the boat is 12 ft from the dock, the length of the rope from the boat to the dock is 3 ft longer than twice the height of the dock above the water. Find the height of the dock.

16. A family plans to replace the vinyl flooring in their 10 foot by 12 foot kitchen. They want to have a border of uniform width made of special material. They can afford only 48 ft\(^2\) of this material. How wide a border can they have?

Solve the following equations:

17. \[
\frac{2}{x+2} + \frac{1}{x+4} = \frac{4}{x^2 + 6x + 8}
\]
18. \[
\sqrt{x + 2} - x = 2
\]
19. \[
\sqrt{x + 3} - \sqrt{3x + 10} = 1
\]
20. \[
(x^2 - 2x)^2 - 11(x^2 - 2x) + 24 = 0
\]
21. \[
x^{\frac{2}{3}} + 7x^{\frac{1}{3}} - 15 = 0
\]
22. \[
|4x + 3| = 7
\]
23. \[
|2x + 1| = |5 - x|
\]
24. Solve the linear inequality. Graph the solution and express the solution using interval notation. \[
7x - 2(x - 3) \leq 5(2 - x)
\]
25. Solve the quadratic inequality. Graph the solution and express the solution using interval notation \[
x^2 + 8x > -12.
\]
26. Solve the rational inequality. Graph the solution and express the solution using interval notation \[
\frac{4x + 1}{x - 2} \leq 3.
\]

In problems 27 & 28, solve the following absolute value inequalities. Write the solution set using interval notation.

27. \[
|2x - 1| < 7
\]
28. \[
\left|\frac{x - 1}{3}\right| \geq 2
\]