1. Determine if the equation has infinitely many solutions, one solution, or no solutions. If it has one solution, state that solution.

   (a) $-6x + 6x - 6 = 2 - 5$

   (b) $-3(x - 6) - 7 = -1 + 3(x - 4)$

   (c) $-2x - 7x + 15 = 9 - 9x + 6$

   (d) $6 - (3 - 2x) + 5x = -3(x - 6)$

2. Solve each rational equation. Remember to check that all of your roots are valid and that you don't have any that result in dividing by 0.

   (a) $\dfrac{1}{2} - \dfrac{7}{2y} = \dfrac{5}{y}$

   (b) $\dfrac{-14}{x^2 - x - 12} - \dfrac{1}{x - 4} = \dfrac{2}{x + 3}$

   (c) $\dfrac{1}{t - 1} = \dfrac{3}{t^2 - 1}$

3. Express each in terms of i.

   (a) $\sqrt{-68}$

   (b) i^{44}

   (c) $\dfrac{i^4 \cdot i^9}{i^{15}}$

4. Complete each operation and write in the form $a + bi$ where $a, b \in \mathbb{R}$.

(a) $(4 - 7i) + (6 + 2i)$

(b) $(3 - 5i)^2$

(c) $(4 - 2i)(6 - 5i)$

(d) $\dfrac{4 + 3i}{2 - 5i}$

5. Solve each quadratic equation. We talked about four methods for solving these equations: quadratic formula, factoring, completing the square, and the square root property. Try to solve each in more than one way.

(a) $y^2 - y - 72 = 0$

(b) $2m(3m - 2) + 4 = 0$

(c) $-4x^2 + 25 = -7$

(d) $x^2 - 8x = 36.$

6. Solve each equation, making sure that the solutions are indeed solutions.

(a) $16x^4 = 48x^2$

(b) $x^{-3/2} = 64$

(c) $x^3 - 2x^2 + 3x - 6$

(d) $(x-2)^2 + 3(x-2) - 18 = 0$

(e) $9x^2 - 288x^{3/4} = 0$

(f) $5|x+4| - 7 = 15$

(g) $\dfrac{3x+4}{x+2} + \dfrac{1}{x-4} = -\dfrac{8}{x^2-2x-8}$

(h) $\sqrt{x+10} - 4 = x$

7. Write in interval notation.

   (a) The set of all numbers greater than -8 and less than or equal to 6.

   (b) The set of all numbers less than -5.

8. Solve each inequality. State the answer in both inequality and interval notation.

   (a) $-3x + 1 \leq 8$

   (b) $-2x + 7 > -4(x - 1)$

   (c) $-10x - 1 < -4x + 1 \leq -10x + 5$

   (d) $2|-3x + 10| > 25$

   (e) $2|x - 6| - 3 \leq 7$