Directions: Complete the following problems. Make sure to SHOW ALL OF YOUR WORK to receive full credit. Reduce, circle, and label all final answers. Round any decimal answers to the nearest hundredth.

Part 1: Factor the expression below.
1. \(3a^2b^8c - 9a^4b^9c^6 + 8a^2b^6c^3\)

Part 2: Simplify each expression below.
1. \(\frac{(3x)^2(9x^3)^2}{21x^5}\)
2. \((x - 2)(4x + 1)(x - 3)\)
3. \(\frac{5x^2 + 17x - 12}{x^2 - 16}\)
4. \(\frac{y}{y+2} - \frac{y}{y-2}\)
Part 3: Complete each problem below.

1. Given \( f(x) = 3x^2 - 4x \) and \( g(x) = 2x + 4 \), find \( g(f(x)) \) and \( g(f(3)) \).

2. Write the equation of a line in slope-intercept form that is a) parallel and b) perpendicular to the line \( y = -\frac{5}{4}x - 1 \) and passes through \((8, -3)\).

3. Given a 30-60-90 triangle whose hypotenuse measures 14 inches, find the exact length of the long leg.

4. Find the inverse of \( f(x) = \frac{7x-4}{3} \).
Part 4: Solve each equation below.

1. \(-36x^2 = -x^6 + 5x^4\)

2. \(3x + 2 = 3\sqrt{3x}\)

3. \(\frac{1}{x^2 - 5x} = \frac{x + 7}{x} - 1\)

4. \(36x^5 + 12x^4 + 9x^3 + 3x^2 = 0\)
Part 5: Solve the inequality below. Graph the solution on a number line.

1. \(-2|3x - 2| + 5 < -7\)

Part 6: Graph each problem below.

1. \(2x - 3y \geq 4 ; 7x + 2y < 14\)