1. [10 pts. each] Solve each equation.

   (a) $q^2 + 2q = 8$

   (b) $y^3 - 6y^2 = -8y$

2. [10 pts. each] Write each in lowest terms.

   (a) $\dfrac{m^2 - 25}{4m - 20}$

   (b) $\dfrac{8x^2 - 10x - 3}{8x^2 - 6x - 9}$

3. [10 pts. each] Multiply or divide as indicated, and write in lowest terms.

   (a) $\dfrac{u^3 v^2}{15u^2 v^4} \div \dfrac{12u^4 v^2}{5v^{11}}$

   (b) $\dfrac{z^2 - 1}{6z} \cdot \dfrac{2}{1 - z}$

4. [10 pts. each] Add or subtract as indicated, and write in lowest terms.

   (a) $\dfrac{5}{x} + \dfrac{9}{4x}$

   (b) $\dfrac{1}{x + 1} - \dfrac{1}{x - 1}$

   (c) $\dfrac{5x}{x - 3} + \dfrac{2}{x} + \dfrac{6}{x^2 - 3x}$

5. [10 pts.] Simplify the complex fraction:

$$\dfrac{4 - \dfrac{1}{p}}{9 + \dfrac{5}{p}}$$

6. [10 pts. each] Solve each equation.

   (a) $2 - \dfrac{5}{2x} = \dfrac{2x}{x + 1}$

   (b) $\dfrac{8}{x^2 - 9} = \dfrac{2}{x - 3} - \dfrac{4}{x + 3}$

7. [10 pts.] Solve $\dfrac{1}{p} + \dfrac{1}{q} = \dfrac{1}{f}$ for p.

8. [15 pts.] The Amtrak Auto Train travels non-stop from Lorton, Virginia to Sanford, Florida. Wanda wishes to bring two cars down to Florida for the winter, so she decides to send one by auto train and drive the other down. The train travels 600 km in the time it takes for her to drive 400 km. If the average speed of the train is 40 km/h greater than the speed of Wanda's car, find the speeds of the train and the car.

9. [10 pts.] At the Merck Corporation it takes one computer 3 hours to print checks for its employees and a second computer 5 hours to complete the same job. How long will it take the two computers to complete the job if they work together?

10. [10 pts.] Solve the system of equations.

$$\begin{cases} 3x - 2y = -7 \\ 2x - y = 3 \end{cases}$$