Solve the following equations. List any restrictions and check for extraneous solutions.

1. \( \frac{2x}{x+3} = \frac{-6}{x+3} - 2 \)
2. \( \frac{x}{x+2} = \frac{3}{2} \)
3. \( \frac{x}{x-2} + 3 = \frac{2}{x-2} \)
4. \( \frac{4}{x-2} = \frac{7}{x^2+3x-10} - \frac{3}{x+5} \)
5. \( \frac{5}{2x-3} = \frac{3}{x+5} \)
6. \( \frac{3}{x-2} = \frac{1}{x-1} + \frac{7}{x^2-3x+2} \)

Solve for the indicated variable.

7. \( C = \frac{5}{9}(F - 32) \) for \( F \)
8. \( \frac{1}{3} = \frac{1}{a} - \frac{1}{b} \) for \( a \)
9. \( xy^2 + xz^2 = xw^2 - 6 \) for \( x \)
10. \( \frac{1}{w} + \frac{1}{x} = \frac{1}{y} \) for \( y \)

Solve the following word problems.

11. It takes a person the same time to drive 150 miles as it takes a plane to fly 1350 miles. If the plane is flying 400 mi/h faster than the car, how fast is each traveling?

12. It took a woman the same time to drive 150 miles as it takes a train to travel 250 miles. If the train is traveling 20 mi/h faster than the woman is driving, find the rate at which each is traveling.

13. Wilma can mow the lawn in 3 hours. If Kyle helps her with another mower, the lawn can be mowed in 2 hours. How long would it take Kyle if he worked alone?

14. Ralph can paint a room in 2 hours, and Joy can paint the same room in 3 hours. If they work together, how long would it take them to paint the room?