Show all set up and work for full points.

For problems 1-6, simplify each expression.

1. $\dfrac{x^2-16}{x^2-8x+16}$

2. $\dfrac{x^2+10x+25}{x^2-9} \cdot \dfrac{x+3}{x+5}$

3. $\dfrac{x^2+7x+10}{2x-4} \div \dfrac{x^2-3x-10}{x-2}$

4. $\dfrac{1}{2x} + \dfrac{5x}{x^2-1} + \dfrac{3}{x+1}$

5. $\dfrac{x-1}{3x+15} - \dfrac{x+3}{5x+25}$

6. $\dfrac{y+\frac{1}{2}}{y-\frac{1}{7}}$

For problems 7-10, solve each equation. State any extraneous solutions.

7. $\dfrac{y-2}{5} - \dfrac{y-5}{4} = -2$

8. $\dfrac{a}{2a-6} - \dfrac{3}{a^2-6a+9} = \dfrac{a-2}{3a-9}$

9. $V = \dfrac{4}{3}\pi r^3 \ for \ \pi$

10. $F = \dfrac{mv^2}{r} \ for \ v^2$

For problems 11-13, set up a table to solve the problem. Answer each problem using a complete sentence.

11. A boat can travel 16 miles up a river in 2 hours. The same boat can travel 36 miles downstream in 3 hours. What is the speed of the boat in still water? What is the speed of the current?

12. Working together, Bill and Tom painted a fence in 8 hours. Last year, Tom painted the fence by himself. The year before, Bill painted it by himself, but took 12 hours less than Tom took. How long did Bill and Tom take, when each was painting alone?

13. A boat, which moves at 30mi/h in still water, travels 3mi downstream in the same amount of time that it takes to travel 2mi upstream. Find the speed of the current.

Challenge Problem:

14. Two mechanics were working on your car. One can complete the given job in six hours, but the new guy takes eight hours. They worked together for the first two hours, but then the first guy left to help another mechanic on a different job. How long will it take the new guy to finish your car?