Exam 4 Prep: Chapters 7 & 8

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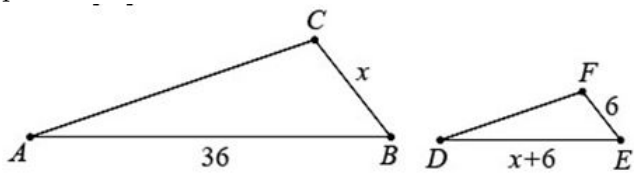
1. Identify each algebraic statement as an expression or an equation. If the statement is an expression, perform the indicated operations and simplify. If the statement is an equation solve it.

   (a) $\frac{7}{x^2+x-12} - \frac{4}{x^2+4x} + \frac{3}{x^2-3x}$ (b) $\frac{3t-5}{4} - \frac{t+1}{6} = \frac{t-2}{6}$ (c) $\frac{2x^2-8}{x^2-4x+4} \div \frac{3x^2-5x-2}{6x^2-10x-4}$

2. In the diagram below, $\triangle ABC$ is similar to $\triangle DEF$. That means that their corresponding sides are proportional.



   (a) Use the fact that the ratio of $\overline{BC}$ to $\overline{AB}$ is equal to the ratio of $\overline{EF}$ to $\overline{DE}$ to write an equation involving x.

   (b) Solve the equation to find all values of x that will work in the diagram and determine the length of $\overline{DE}$.

3. Recall that $\sqrt{x}$ is defined for $x \geq 0$ as the positive number whose square is x.
   (a) Simplify the expression$(\sqrt{x} - \sqrt{81})^2$ for $x = 16$.
   (b) Find all values of x so that $\sqrt{(x^2+1} - \sqrt{16} = 3$ and simplify these.

4. For each motion problem below, (i) Identify a variable, (ii) Fill in a table for distance D, rate R, and time T as shown at right, (iii) set up an equation and (iv) solve the equation to answer the question.

	Distance	Rate	Time
1st situtation			
2nd situtation			

   (a) A ferry goes 10 mph in still water. If it takes $\frac{5}{8}$ hour to travel the same distance upstream that it takes $\frac{5}{12}$ hour to travel downstream, what is the speed of the current?

   (b) Betty bicycles 12 mph faster when she goes 36 miles downhill than she does bicycling the same distance up the hill. If the trip up and down takes 8 hours, what is Betty's speed bicycling uphill?

   (c) There is a steady wind of 50 kph. If it takes a pilot 2 hours longer to fly a plane 8800 km against the wind than it does to fly 8100 km with the wind, what is the speed of the plane in still air?

5. Simplify each expression:

   (a) $\sqrt{8} + \sqrt{32}$ (b) $\frac{1}{\sqrt{2}} + \frac{2}{\sqrt{3}}$ (c) $(1-\sqrt{17})(1+\sqrt{17})$ (d) $\frac{\sqrt{7}-\sqrt{5}}{\sqrt{7}+\sqrt{5}}$

6. Solve the following equations

   (a) $\sqrt{4x+16} + 4 = 10$ (b) $\sqrt{2x+6} = x - 1$

7. The legs of a right triangle have lengths $\sqrt[3]{2} - 1$ and $\sqrt[3]{2} + 1$ Compute and simplify the length of the hypotenuse using Pythagoras' theorem.