**Activity 4.5.2 Solving Equations with Fractions and Rational Expressions**

Solve each equation or problem.

1. $\frac{4+x}{x+7}=\frac{2}{3}$
2. $\frac{5}{x+9}=\frac{7}{x-12}$
3. $\frac{2}{5x^{2}-4}=\frac{4}{10x^{2}-3x}$
4. $\frac{4x}{4x+4}=-\frac{1}{4x+4}$
5. $\frac{2x}{3}+\frac{5x}{2}=\frac{11}{6}$
6. $\frac{1}{x+9}- \frac{6}{x^{2}}=\frac{1}{x^{3}+9x^{2}}$
7. $\frac{2}{x-5}+\frac{x}{x+5}=\frac{x^{2}-2x+5}{x^{2}-25}$
8. A rectangle that has a perimeter of 22 meters has a width that is four less than one half its length. Find the length and the width of the rectangle.
9. A parallelogram has a base whose measure is given by 2a/(a +2) and the measure of the adjacent side is a/(a +1).
10. Find the value of a if the perimeter is 4 meters.
11. Round the value to the nearest hundredth.
12. Using the rounded value in part b, find the measures of the base and adjacent side if the perimeter is 4 meters.
13. In unit 1, you combined functions finding f(x) + g(x) and f(x) – g(x). If $f\left(x\right)=\frac{x}{2x-1}$ and $g\left(x\right)=\frac{8x^{2}}{4x^{2}-1}$
14. Find h(x) = f(x) + g(x) and find the domain of h
15. Find k(x) = f(x) – g(x) and find the domain of k
16. Now solve f(x) – g(x) = 0
17. If $f\left(x\right)=\frac{2x+4}{x^{2}+6x+9}$ and $g\left(x\right)=\frac{x^{2 }+3x}{x^{2}+2x}$ find k(x) where k is the product of f and g.
18. Domain of f is
19. Domain of g is
20. Domain of k is
21. Does the graph of k cross the x axis? Explain.
22. Solve f(x)g(x) = 0
23. A boat can travel 10 miles downstream (with the current) in the same amount of time it can travel 8 miles upstream (against the current).If the speed of the current is 2mph, what is the speed of the boat in still water? Hint: D = RT
24. Jayden wants to help his grandfather stain the deck. Last year he did it for his grandfather and it took 6 hours. His grandfather can do it by himself in 5 hours. This year they will do it together so it will not take long. How long will it take this year?
25. To make a spray solution to kill poison ivy, Allen needed to mix 5 parts of water to 2 parts of the liquid ivy killer. If he used 15 more quarts of water than quarts of the liquid ivy killer, how much water did he use?