Solving Equations Containing Rational Expressions -
Section 7.3 – 7.4 in MATH 0034

Class Strategy:

Discovery Learning Activity: Students do Activity 5.4(Blood – Alcohol Levels) – Mathematics in Action – Algebraic, Graphic, & Trigonometric Problems Solving – Second Edition - The Consortium For Foundation Mathematics

In 1992, the U.S. Department of Transportation recommended that states adopt 0.08% blood – alcohol concentration as the legal measure of drunk driving. If you assume that a regular 12 – ounce beer is 5% alcohol by volume and that the normal bloodstream contains 5 liters (0r 169 ounces) of fluid, your maximum blood – alcohol concentration, B, can be approximately modeled by the function having the equation

$$B = \frac{600n}{w(169 + 0.6n)}$$

where n is the number of beers consumed in one hour and w is your body weight in pounds.

1.a. Replace w with your body weight. Write an equation for B in terms of n.

b. Complete the following table using your equation from part a.

Number of Beers, *n*	1	2	3	4	5	6	7	8	9	10
Blood – Alcohol Concentration, *B*										

2. According to this model, how many beers can you consume in one hour without exceeding the recommended legal measure of drunk driving?

3.a. A football player friend of yours weighs 232 pounds. Rewrite the equation for B in terms of *n.* What is his maximum blood-alcohol level if he drinks four beers in one hour?

b. Complete the following table using your equation in part a.

Number of Beers, *n*	1	2	3	4	5	6	7	8	9	10
Blood – Alcohol Concentration, *B*										

4.a. Your 232- pound football player friend is given a breathalyzer test. The result is a blood-alcohol concentration of 0.05%. Using the blood- alcohol concentration function, write an equation that can be solved to determine the number of beers your friend consumed in the previous hour.

Instructor Led Discussion:

Example 1:

Method 1: Solve $\frac{16}{x+3}=2$, by multiplying both sides by the LCD

$$\frac{16}{x+3}=2$$
$$(x+3)\cdot\frac{16}{x+3}=2(x+3)$$
$$16=2x+6$$
$$10=2x$$
$$5=x$$
check: $\frac{16}{5+3}=\frac{16}{8}=2$

Method 2: Solve $\frac{16}{x+3}=2$, by cross multiplying

$$\frac{16}{x+3}=\frac{2}{1}$$
$$2(x+3)=16\cdot 1$$
$$2x+6=16$$
$$2x=10$$
$$x=5$$

Student Practice:

5.a. $\frac{45}{x}=9$ b. $\frac{23}{x+2}=15$

c. $\frac{13}{x} = \frac{2}{5}$

d. $\frac{16}{x^2} = \frac{1}{4}$

6.a. Solve the equation in problem 4a using an algebraic approach.

Continue with ILD:

1. Solve $\frac{-2}{3x}+\frac{8}{3}=\frac{2}{x}$

2. Solve $\frac{2}{x+1}+\frac{1}{3x+3}=\frac{2}{3}$

3. Solve $\frac{2}{x}+1=\frac{3}{x^2}$

4. Solve $\frac{8}{x+2}=1+\frac{2}{x}$

MATH 101
SUMMARY 7.3, 7.4

Solving Equations Containing Rational Expressions

1. Multiple both sides of the equation by the _____
2. Distribute; that is, multiply every term of the equation by the _____
3. Multiply by canceling common _____
4. Solve the resulting equation (it should have no fraction) _____

Example 1: $\frac{5}{3}-\frac{2}{3x}=\frac{6}{x}$

Example 2: $\frac{3}{5}-\frac{1}{x-1}=\frac{7}{5x-5}$

Example 3: $\frac{x^2}{x+100}=50$