Solving Equations and Word Problems Containing Rational Expressions Video Lecture

Sections 7.5 and 7.6

Course Learning Objective:

1) Solve certain types of rational equations.
2) Model applications based on these types of equations.

Weekly Learning Objectives:

1) Solve equations containing rational expressions.
2) Solve equations containing rational expressions for a specified variable.
3) Solve equations with negative exponents.
4) Solve problems about work.
5) Solve problems about distance.
Solving Equations and Word Problems with Rational Expressions

How to solve equations containing rational expressions:
1) Find the LCD of all fractions in the equation
2) Multiply both sides of the equation (EACH TERM) by the LCD
3) Simplify and the equation should no longer contain fractions
4) Classify resulting equation and solve accordingly
5) Spot check for solutions

Solve:

\[ \frac{2}{3x+1} = \frac{1}{x} - \frac{6x}{3x+1} \]

\[ \frac{5}{x^2-7x+12} = \frac{2}{x-3} + \frac{5}{x-4} \]
\[
\frac{3}{2+k} + \frac{1}{2-k} = \frac{2}{k^2-4}
\]

\[
\frac{5x+14}{x^2-9} = -\frac{2x^2-5x+2}{x^2-9} + \frac{2x+4}{x-3}
\]
$p^{-2} + 4p^{-1} - 5 = 0$

Solve for $x$: $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$
Word Problems:

Jim's boat goes 12 miles per hour. Find the speed of the current of the river if he can go 6 miles upstream in the same amount of time he can go 10 miles downstream.

An F-100 plane and a Toyota Truck leave the same town at sunrise and head for a town 450 miles away. The speed of the plane is three times the speed of the truck, and the plane arrives 6 hours ahead of the truck. Find the speed of the truck.
An experienced bricklayer constructs a small wall in 3 hours. An apprentice completes the job in 6 hours. Find how long it takes if they work together.

Mike can paint a room in 6 hours working alone. If Joan helps him, the job takes 4 hours. How long would it take Joan to do the job if she worked alone?