

Unit 2 Lesson 22: Solving Rational Equations

1 Notice and Wonder: Thoughtful Multiplication (Warm up)

Student Task Statement

What do you notice? What do you wonder?

$$\begin{aligned}\frac{3}{x(x-2)} &= \frac{2x+1}{x-2} \\ \frac{3}{x(x-2)} \cdot x(x-2) &= \frac{2x+1}{x-2} \cdot x(x-2) \\ 3 &= 2x^2 + x \\ 0 &= 2x^2 + x - 3\end{aligned}$$

2 Rational Solving

Student Task Statement

Jada is working to find values of x that make this equation true:

$$\frac{5x + 5}{x + 1} = \frac{5}{x}$$

She says, "If I multiply both sides by $x(x + 1)$, I find that the solutions are $x = 1$ and $x = -1$, but when I substitute in $x = -1$, the equation does not make any sense."

1. Is Jada's work correct? Explain or show your reasoning.
2. Why does Jada's method produce an x value that does not solve the equation?

3 More Rational Solving

Student Task Statement

1. Here are a lot of equations. For each one, use what you know about division to identify values of x that cannot be solutions to the equation.

a. $\frac{x^2 + x - 6}{x - 2} = 5$

b. $\frac{2x + 1}{x} = \frac{1}{x - 2}$

c. $\frac{10}{x + 8} = \frac{5}{x - 8}$

d. $\frac{x^2 + x + 1}{13} = \frac{2}{x - 1}$

e. $\frac{x + 1}{4x} = \frac{x - 1}{3x}$

f. $\frac{1}{x} = \frac{1}{x(x + 1)}$

g. $\frac{x + 2}{x} = \frac{3}{x - 2}$

h. $\frac{1}{x - 3} = \frac{1}{x(x - 3)}$

i. $\frac{(x + 1)(x + 2)}{x + 1} = \frac{x + 2}{x + 1}$

2. Without solving, identify three of the equations that you think would be least difficult to solve and three that you think would be most difficult to solve. Be prepared to explain your reasoning.
3. Choose three equations to solve. At least one should be from your "least difficult" list and one should be from your "most difficult" list.