7.3 - Multiplying and Dividing Rational Expressions

Multiply Rational Expressions

$$\frac{x^2 - 3x - 4}{x^2 - 1} \cdot \frac{x^2 - 2x + 1}{x^2 - 2x - 8} = \frac{(x-4)(x+1)}{(x-1)(x+1)} \cdot \frac{(x-1)(x-1)}{(x-4)(x+2)}$$

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

Practice

1. $\dfrac{u^2 v}{u+v} \div (u+v) \cdot \dfrac{u^2 + 2uv + v^2}{uv^2 - u^2 v}$

$$\frac{u}{v-u}$$

2. $\dfrac{x^2 + 3ax}{3a - x} \cdot \dfrac{x^2 - 4ax + 3a^2}{a^2 - x^2} \div \dfrac{x+3a}{x+a}$

$$x$$

7.5 - Adding and Subtracting Rational Expressions

LCD $24a^2b^2$

$$\frac{1}{6a^2} - \frac{1}{2ab} + \frac{3}{8b^2} = \frac{1 \cdot 4b^2}{6a^2 \cdot 4b^2} - \frac{1 \cdot 12ab}{2ab \cdot 12ab} + \frac{3 \cdot 3a^2}{8b^2 \cdot 3a^2}$$

$$= \frac{4b^2 - 12ab + 9a^2}{24a^2b^2}$$

$$= \frac{(2b - 3a)(2b - 3a)}{24a^2b^2}$$

Practice

1. $\dfrac{x}{x-a} - \dfrac{x^2+a^2}{x^2-a^2} + \dfrac{a}{x+a}$

$\dfrac{2a}{x+a}$

2. $\dfrac{3u}{2u-v} - \dfrac{2u}{2u+v} + \dfrac{2v^2}{4u^2-v^2}$

$\dfrac{u+2v}{2u-v}$

7.5 - Solving Rational Equations

$$\frac{x}{3} + \frac{5}{6} = \frac{3}{2}$$

$$6\left(\frac{2x}{6} + \frac{5}{6} = \frac{9}{6}\right)$$

$$2x + 5 = 9$$

$$2x = 4$$

$$\frac{2x}{6} + \frac{5}{6} = \frac{9}{6}$$

$$x = 2$$

Practice

1. $\dfrac{x(x+1)}{5} - \dfrac{x+1}{6} = \dfrac{1}{3}$

2. $\dfrac{2t(3t+1)}{5} - \dfrac{t+1}{2} = \dfrac{1}{10}$

$$x = -\frac{5}{3}, \frac{3}{2}$$

$$x = -\frac{2}{3}, \frac{3}{4}$$

7.5 - Solving Rational Equations

$$\frac{3x}{4} + 1 > \frac{x-1}{2}$$

$$\frac{3x}{4} + \frac{4}{4} > \frac{2(x-1)}{4}$$

$$3x + 4 > 2x - 2$$

$$x + 4 > -2$$

$$x > -6$$

Practice

1. $\dfrac{y^2 + 4}{6} + \dfrac{y+1}{3} < \dfrac{3}{2}$

$-3 < y < 1$

2. $\dfrac{t^2}{6} + \dfrac{t-2}{4} \geq \dfrac{t+1}{3}$

$t \leq -2 \ or \ t \geq \dfrac{5}{2}$

7.5 - Solving Rational Equations

Practice

A house can be built in 34 days by 25 men. After 16 days, 10 men quit work. In how many more days can the rest finish the work?

30 more days

Remaining house to complete 1 - 16/34 = 9/17

Each man can complete 1/(34 * 25) = 1/850 of the house in a day

15 remaining men can complete 15/850 = 3/170 of house in a day

It takes (9/17) / (3/170) = 30 more days