

# Rational Expressions and Partial Fractions

10.29.15

Lesson 18

Section 4.6

Warm-up

$$1) \frac{1}{2} + \frac{5}{3} =$$

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

$$3) \frac{2a}{3} = \frac{4}{6}, a = ?$$

*Factor*

$$4) x^2 - 4$$

$$5) 3x^2 + x$$

A ***Rational Equation*** is an equation that contains one or more rational expressions.

What do we need to do before we can add or subtract fractions?

I Try:

$$x + \frac{8}{x} = 6$$

Find common denominator	
Convert everything so they have the same common denominator	
Cancel out the denominators	
Solve for the variable	
Check your answers!	

I Try: Solve for a

$$a + \frac{a^2 - 5}{a^2 - 1} = \frac{a^2 + a + 2}{a + 1}$$

Find common denominator	
Convert everything so they have the same common denominator	
Cancel out the denominators	
Solve for the variable	
Check your answers	

We Try:  
Solve for m

$$\frac{1}{m} = \frac{m - 36}{2m^2}$$

Find common denominator	
Convert everything so they have the same common denominator	
Cancel out the denominators	
Solve for the variable	
Check your answers	

We Try:

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

Find common denominator	
Convert everything so they have the same common denominator	
Cancel out the denominators	
Solve for the variable	
Check your answers	

You Try with your partner on whiteboards:  
Right Talk, Left Write

$$\frac{10}{3} = \frac{4}{x} + 2$$

Find common denominator	
Convert everything so they have the same common denominator	
Cancel out the denominators	
Solve for the variable	
Check your answers	

You Try with your partners:

Left Talk, Right Write

$$\frac{2x - 9}{x - 7} + \frac{x}{2} = \frac{5}{x - 7}$$

Find common denominator	
Convert everything so they have the same common denominator	
Cancel out the denominators	
Solve for the variable	
Check your answers	

You Try SOLO on your whiteboards

$$x = \frac{6}{x} - 1$$

Find common denominator	
Convert everything so they have the same common denominator	
Cancel out the denominators	
Solve for the variable	
Check your answers	



You Try SOLO on whiteboards

$$4 + \frac{1}{x} = \frac{10}{2x}$$

Find common denominator	
Convert everything so they have the same common denominator	
Cancel out the denominators	
Solve for the variable	
Check your answers	

A **Partial Fraction** is the sum of two fractions that form a rational expression.

I Try:  
Decompose  $\frac{8y+7}{y^2+y-2}$  into a partial fraction.

Factor the denominator	
Express fraction in terms of A and B as numerators and factors as denominators.	
Cancel out the denominators by converting the fractions.	
Solve for A by setting a factor to 0.	
Repeat and solve for B.	
Substitute A and B to get the partial fraction.	

We Try:  
Decompose  $\frac{1}{2x^2+x}$  into a partial fraction.

Factor the denominator	
Express fraction in terms of A and B as numerators and factors as denominators.	
Cancel out the denominators by converting the fractions.	
Solve for A by setting a factor to 0.	
Repeat and solve for B.	
Substitute A and B to get the partial fraction.	

You Try with your partner on the whiteboards:  
Left Talk, Right Write.

Decompose  $\frac{x+2}{x^2+4x+3}$  into a partial fraction.

Factor the denominator	
Express fraction in terms of A and B as numerators and factors as denominators.	
Cancel out the denominators by converting the fractions.	
Solve for A by setting a factor to 0.	
Repeat and solve for B.	
Substitute A and B to get the partial fraction.	

You Try with your partners Right Talk, Left Write:

Decompose  $\frac{5}{x^2+x-6}$  into a partial fraction

Factor the denominator	
Express fraction in terms of A and B as numerators and factors as denominators.	
Cancel out the denominators by converting the fractions.	
Solve for A by setting a factor to 0.	
Repeat and solve for B.	
Substitute A and B to get the partial fraction.	

You Try SOLO on whiteboards.

Decompose  $\frac{1}{x^2-1}$  into a partial fraction.

Factor the denominator	
Express fraction in terms of A and B as numerators and factors as denominators.	
Cancel out the denominators by converting the fractions.	
Solve for A by setting a factor to 0.	
Repeat and solve for B.	
Substitute A and B to get the partial fraction.	

Exit Slip

On a half piece of paper by yourself.

1) Solve for a

$$a - \frac{5}{a} = 4$$

2) Decompose  $\frac{3}{x^2-3x}$  into a partial fraction