

11.2 Rational Expressions and Function

11.3 Simplifying Rational Expressions

Objectives:

1. Factor the numerator and denominator to simplify rational expressions.
2. State any restrictions on the variable.

Recall Previous Knowledge:

Rational Expression- An expression in the form $\frac{P}{Q}$. Where $Q \neq 0$

Why can't $Q=0$? We are not allowed to divide by 0 (have a 0 as the denominator)
If the denominator is 0, we consider that expression to be undefined.

Domain- The possible values of the independent variable which can be included in the function.

Factoring by:

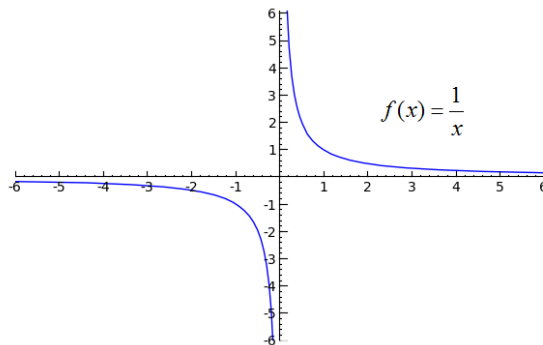
1. GCF
2. Short Reverse Foil/ Difference of Two Squares
3. Slide and Divide

Sections 11.2 and 11.3 are heavy with factoring.

The parent function of rational equations is

$$y = a \frac{1}{(x - h)} + k$$

The graph of this parent function looks like this:



Notice that the graph never touches when $x=0$, why?

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So how do we simplify rational expressions?

It's quite an easy process...

Step 1: Factor the numerator and denominator.

Step 2: Cancel common factor pairs in the numerator and denominator. Each cancellation is equal to 1.

Step 3: Simplify and state any restrictions on the variable.

Let's try one.

$$\begin{aligned}
 &\frac{5a+10}{10a} \\
 &\frac{5(a+2)}{10a} \\
 &\frac{\cancel{5}(a+2)}{10a} \quad a \neq 0 \\
 &\frac{a+2}{2a}
 \end{aligned}$$

Notice that I can not cancel parts of the factors, only the whole factor or nothing.

Want to try another?

$$\begin{aligned}
 \frac{3x-6}{x^2+x-6} &= \frac{3(x-2)}{(x+3)(x-2)} \quad \text{Notice that the two factors (x-2) cancel.} \\
 &= \frac{3(x-2)}{(x+3)(x-2)} \\
 &= \frac{3}{x+3}, x \neq -3
 \end{aligned}$$

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Classwork: Pg 542

#19.	#25.	#29.
#33.	#35.	#43.

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Homework: Pg 542

#22.	#24.	#28.
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