

## Core Content

<b>Cluster Title: Rewrite rational expressions.</b>
<b>Standard A.APR.6:</b> Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$ , where $a(x)$ , $b(x)$ , and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$ , using inspection, long division, or, for the more complicated examples, a computer algebra system.
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>• Divide polynomials and recognize when your divisor is a factor and when you will have non-zero remainders.</li> <li>• Use long division to rewrite a rational expression in the form <math>g(x) + r(x)/b(x)</math>.</li> <li>• Use a computer algebra system to divide complicated polynomials.</li> </ul>

## Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>• Multiplying/adding/subtracting polynomials</li> </ul>	
<b>Academic Vocabulary</b>	
rational expression, computer algebra system, degree	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>• Relate division of whole numbers to the division of polynomials.</li> </ul>	
<b>Sample Formative Assessment Tasks</b>	
<p><b>Skill-Based Task:</b> Perform each operation:</p> <p>A. <math>\frac{x^2 + 2x + 3}{x}</math></p> <p>B. <math>\frac{x^3 + 2x - x - 2}{x + 1}</math></p> <p>C. <math>\frac{x^3 + 2x - x - 2}{x + 3}</math></p>	<p><b>Problem Task:</b> Write a division problem whose result would be as follows:</p> $x^2 + 3x + \frac{2}{x - 5}$

## Core Content

<b>Cluster Title: Rewrite rational expressions.</b>
<b>Standard A.APR.7:</b> Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>Add, subtract, multiply, and divide rational expressions.</li> <li>Demonstrate that rational expressions are closed under addition, subtraction, multiplication, and non-zero division.</li> </ul>

## Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>Dividing polynomials and recognizing when your divisor is a factor and when you will have non-zero remainders (III.A.APR.6)</li> <li>Closure of polynomials (II.A.APR.1)</li> </ul>	
<b>Academic Vocabulary</b>	
closure, rational expression	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>Illustrate how performing operations with rational expressions can use the same algorithmic processes as performing operations with rational numbers.</li> </ul>	
<b>Sample Formative Assessment Tasks</b>	
<p><b>Skill-Based Task:</b></p> <p>Perform the following operations: <math>\frac{x}{x+3} + \frac{x+2}{x+5}</math>,</p> $\frac{x+4}{x^2+5x+6} \cdot \frac{x+3}{x^2-16}, \frac{2}{x^2-9} - \frac{3x}{x^2-5x+6}, \frac{x+4}{xx^2-5x+6} \div \frac{x^2-16}{x+3}$	<p><b>Problem Task:</b></p> <p>Compare and contrast the operations addition, subtraction, division, multiplication, and division on whole numbers to the same operations performed on polynomials. Example:</p> $\frac{3}{4} + \frac{5}{6} \text{ and } \frac{x}{x+1} + \frac{8}{x+3}$