Know it! Note

Least Common Multiple (LCM) of Polynomials
To find the LCM of polynomials:
1. Factor each polynomial completely. Write any repeated factors as powers. For example, $x^3 + 6x^2 + 9x = x(x + 3)^2$.
2. List the different factors. If the polynomials have common factors, use the highest power of each common factor.

COMMON CORE GPS **EXAMPLE 2** Prep MCC9-12.A.APR.7(+)

Finding the Least Common Multiple of Polynomials

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Find the least common multiple for each pair.

A $2x^3y^4$ and $3x^5y^3$

$2x^3y^4 = 2 \cdot x^3 \cdot y^4$

$3x^5y^3 = 3 \cdot x^5 \cdot y^3$

The LCM is $2 \cdot 3 \cdot x^5 \cdot y^4$, or $6x^5y^4$.

B $x^2 + 3x - 4$ and $x^2 - 3x + 2$

$x^2 + 3x - 4 = (x + 4)(x - 1)$

$x^2 - 3x + 2 = (x - 2)(x - 1)$

The LCM is $(x + 4)(x - 1)(x - 2)$.

CHECK IT OUT!

Find the least common multiple for each pair.

2a. $4x^3y^7$ and $3x^5y^4$ **2b.** $x^2 - 4$ and $x^2 + 5x + 6$

To add rational expressions with unlike denominators, rewrite both expressions with the LCD. This process is similar to adding fractions.

$$\frac{2}{6} + \frac{3}{10} = \frac{2}{2 \cdot 3}\left(\frac{5}{5}\right) + \frac{3}{2 \cdot 5}\left(\frac{3}{3}\right)$$
$$= \frac{10}{30} + \frac{9}{30} = \frac{19}{30}$$

COMMON CORE GPS **EXAMPLE 3** MCC9-12.A.APR.7(+)

Adding Rational Expressions

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Add. Identify any x-values for which the expression is undefined.

A $\dfrac{x - 1}{x^2 + 3x + 2} + \dfrac{x}{x + 1}$

$\dfrac{x - 1}{(x + 2)(x + 1)} + \dfrac{x}{x + 1}$ *Factor the denominators.*

$\dfrac{x - 1}{(x + 2)(x + 1)} + \dfrac{x}{x + 1}\left(\dfrac{x + 2}{x + 2}\right)$ *The LCD is $(x + 2)(x + 1)$, so multiply $\frac{x}{x + 1}$ by $\frac{x + 2}{x + 2}$.*

$\dfrac{x - 1 + x(x + 2)}{(x + 2)(x + 1)}$ *Add the numerators.*

$\dfrac{x^2 + 3x - 1}{(x + 2)(x + 1)}$ *Simplify the numerator.*

$\dfrac{x^2 + 3x - 1}{(x + 2)(x + 1)}$ or $\dfrac{x^2 + 3x - 1}{x^2 + 3x + 2}$ *Write the sum in factored or expanded form.*

The expression is undefined at $x = -2$ and $x = -1$ because these values of x make the factors $(x + 2)$ and $(x + 1)$ equal 0.