LCD: $(x-3)(x-9)$

AM: Subtract Rational Expressions

4. $-\dfrac{8}{x^2-12x+27}-\dfrac{3}{x-9}$

$$\frac{-8}{(x-3)(x-9)} - \frac{3}{x-9}\cdot\frac{(x-3)}{(x-3)} = \frac{-8-3x+9}{(x-3)(x-9)}$$

$$\boxed{x^2-9x-3x+27}$$

$$\frac{-3x+1}{x^2-12x+27}$$

LO: The ___________ ___________ ________________ is needed to add these __________________ functions, therefore we must factor the ____________________ numerators and denominators into __________ polynomials and then construct the LCD by choosing the largest power of each linear or irreducible quadratic to be a factor in the LCD.

5

$(x-1)\cdot(-x^2-x-1)$

AM: Simplify, Multiply and Divide Rational Expressions

1. Simplify. $\frac{1-x^3}{x^2-1} = \frac{\cancel{(x-1)}(-x^2-x-1)}{(x+1)\cancel{(x-1)}} = \frac{-x^2-x-1}{x+1}$

[A] $\frac{-(1+x+x^2)}{x+1}$ [B] $\frac{1+x+x^2}{x+1}$ [C] $\frac{-(1-x+x^2)}{x+1}$ ~~[D]~~ $1-x$

LO: To simplify a rational expression we must determine the greatest common factor for the numerator and denominator polynomials. Therefore factor the polynomial numerators and denominators into prime polynomials and then construct the GCF by choosing the smallest power of each linear or irreducible quadratic that is a factor of both the numerator and denominator polynomials. Complete the simplification by recognizing that the

$\frac{\text{GCF}}{\text{GCF}} = \frac{(x-1)(\quad)}{(x-1)(\quad)} = 1.$

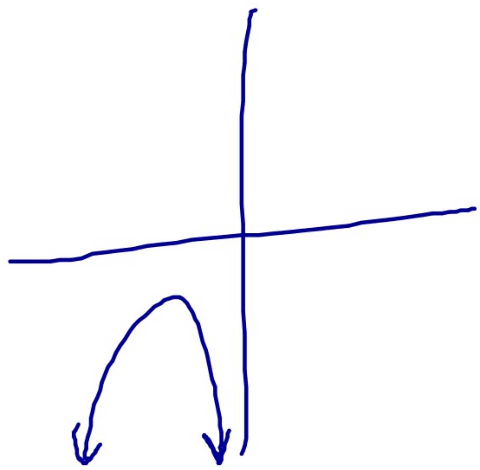
6

$1 - x^3 \rightarrow -x^3 + 1$

$$\begin{array}{c|cccc} 1 & -1 & 0 & 0 & 1 \\ + & \downarrow & -1 & -1 & -1 \\ \hline & -1 & -1 & -1 & 0 \end{array} \Rightarrow (x-1)$$

$$\underbrace{-1 \quad -1 \quad -1}_{-x^2 - x - 1}$$

IRREDUCIBLE



$$1-x^3 \longrightarrow -x^3+1$$

$$
\begin{array}{r|rrrr}
1 & -1 & 0 & 0 & 1 \\
+ & \downarrow & -1 & -1 & -1 \\
\hline
 & -1 & -1 & -1 & 0
\end{array}
\Rightarrow (x-1)
$$

$$\underbrace{-1 \quad -1 \quad -1}_{-x^2-x-1}$$

AM: Simplify, Multiply and Divide Rational Expressions

$A^2 - B^2 = (A+B)(A-B)$

$A^2 - \cancel{AB + AB} - B^2$

$16x^2 - 9y^2 \rightarrow (4x)^2 - (3y)^2$

A B

3. Find the simplified product.

$$\frac{x-3}{4x-3y} \cdot \frac{16x^2-9y^2}{3x^2-14x+15} = \frac{(x-3)}{4x-3y} \cdot$$

[A] $\frac{4x^2+3y^2}{3x-5}$ [B] $\frac{4x-3y}{3x-5}$ [C] $\frac{4x+3y}{3x-5}$ [D] $\frac{4x-3y}{-2x-14}$

$(4x+3y) \cdot (4x-3y)$

$$\frac{\cancel{x-3}}{\cancel{4x-3y}} \cdot \frac{(4x+3y)\cancel{(4x-3y)}}{\cancel{(x-3)}(3x-5)} = \frac{4x+3y}{3x-5}$$

GCF: $(x-3)(4x-3y)$

$$\begin{array}{r|rrr} 3 & 3 & -14 & 15 \\ + & \downarrow & 9 & -15 \\ \hline & 3 & -5 & 0 \end{array} \Rightarrow (x-3)$$

$(3x-5)$

6

$\frac{2}{3} \div \frac{5}{6}$ $\frac{2}{3} * \frac{6}{5}$

AM: Simplify, Multiply and Divide Rational Expressions

2. Divide: $\frac{r^2+7r+6}{r^2+2r-24} \div \frac{r^2-1}{r^2-6r+8}$ $\longrightarrow$ $\frac{r^2+7r+6}{r^2+2r-24} \cdot \frac{r^2-6r+8}{r^2-1}$

[A] $\frac{r-2}{r-1}$ [B] $\frac{r+1}{r-4}$ [C] $\frac{r-1}{r-2}$ [D] $\frac{r-4}{r+1}$

LO: Change division into multiplication by the _____________ . Then factor the _________________ numerators and denominators into _________ polynomials and then construct the GCF by choosing the smallest power of each linear or irreducible quadratic that is a factor of both the numerator and denominator polynomials. Complete the simplification by recognizing that the

GCF= (   )(   )(   ) = 1.
GCF   (   )(   )(   )

6

Slide 2- 11