

**Simplifying:** Cancel terms

$$\frac{10x^2y}{15x^5y^2} = \frac{\overset{\text{like factors}}{\cancel{2}} \cdot \overset{\text{like factors}}{\cancel{5}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot y}{\cancel{3} \cdot \overset{\text{like factors}}{\cancel{5}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot \overset{\text{like factors}}{\cancel{x}} \cdot y \cdot y} = \frac{2}{3x^3y}$$

**Simplifying with multiplication:** Cancel terms vertically or diagonally

$$\frac{4xy^2}{3y} \cdot \frac{2x}{4y} =$$

$$= \frac{\cancel{4}xy^2 \cdot 2x}{3y \cdot \cancel{4}y} = \frac{2x^2y^2}{3y^2} = \frac{2x^2}{3}$$

**Multiplying:** FACTOR and cancel whole factors

$$\frac{4x+8}{x^2-25} \cdot \frac{x-5}{5x+10}$$

$$\frac{4(\cancel{x+2})}{(x+5)(\cancel{x-5})} \cdot \frac{\cancel{x-5}}{5(\cancel{x+2})} = \frac{4}{5(x+5)}$$

**Dividing:** Keep Change Flip, FACTOR, and cancel whole factors

$$\frac{x+4}{2x-6} \div \frac{3x+12}{4x-12} = \frac{x+4}{2x-6} \cdot \frac{4x-12}{3x+12} =$$

$$= \frac{\cancel{x+4}}{2(\cancel{x-3})} \cdot \frac{4(\cancel{x-3})}{3(\cancel{x+4})} = \frac{1}{2} \cdot \frac{4}{3} = \frac{2}{3}$$

**Adding:** Factor, get common denominators, simplify numerator (leave denominator in factored form)

$$\frac{x-5}{x^2-9} + \frac{x+12}{x+3} = \frac{x-5}{(x+3)(x-3)} + \frac{x+12}{x+3} \cdot \frac{x-3}{x-3}$$

$$= \frac{(x-5) + (x^2+9x-36)}{(x+3)(x-3)} = \frac{x-5+x^2+9x-36}{x^2-9}$$

$$= \frac{x^2+10x-41}{x^2-9} \quad \text{LCD: } (x+3)(x-3) = x^2-9$$

**Subtracting:** Factor, get common denominators, foil negative, simplify numerator (leave denominator in factored form)

$$\frac{x+2}{x-1} - \frac{12}{x+6} = \frac{(x+2)(x+6)}{(x-1)(x+6)} - \frac{12(x-1)}{(x-1)(x+6)}$$

$$= \frac{x^2+8x+12}{(x-1)(x+6)} - \frac{12x-12}{(x-1)(x+6)}$$

$$= \frac{x^2+8x+12-(12x-12)}{(x-1)(x+6)}$$

$$= \frac{x^2+8x+12-12x+12}{(x-1)(x+6)}$$

$$= \frac{x^2-4x+24}{(x-1)(x+6)}$$

**Solving:** Factor, get common denominators, cross through denominators, solve what is left on top, DON'T FORGET EXCLUDED VALUES

$$\frac{x}{x+3} = \frac{8}{x+6}$$

$$\frac{x(x+6)}{(x+3)(x+6)} = \frac{8(x+3)}{(x+6)(x+3)}$$

$$x^2+6x=8x+24$$

$$x^2-2x-24=0$$

$$(x-6)(x+4)=0$$

$$x=6; \quad x=-4$$

**Word Problems:** Time tog./Time alone + Time tog./Time alone = 1

$$\frac{x}{6} + \frac{x}{4} = 1$$

$$(12)\left(\frac{x}{6}\right) + (12)\left(\frac{x}{4}\right) = (12)(1)$$

$$2x + 3x = 12$$

$$5x = 12$$

$$x = \frac{12}{5} = 2\frac{2}{5} \text{ hours}$$

**Graphing:**

**Vertical Asymptote:**

**Point of Discontinuity or** \_\_\_\_\_:

**Horizontal Asymptote:**

Numerator > Denominator: \_\_\_\_\_

Numerator < Denominator: \_\_\_\_\_

Numerator = Denominator: \_\_\_\_\_

**Domain:**

All real #s except \_\_\_\_\_ & \_\_\_\_\_

**Range:**

All real #s except \_\_\_\_\_ & \_\_\_\_\_

**Complex Fractions: (HONORS)** Get

common denominators on top and bottom, Simplify numerator and denominator separately, Keep Change Flip, cancel

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

$$= \frac{\cancel{x}(x+1)}{\cancel{x}(x-1)} = \frac{x+1}{x-1}$$

<p>1. What is the excluded value?</p> $\frac{x-1}{2x+6}$	<p>2. Simplify:</p> $\frac{a^3 - a}{a^2 - 1}$	<p>3. Multiply and simplify:</p> $\frac{32x^2}{y^4} \cdot \frac{5y^3}{8x^2}$	<p>4. Simplify and state excluded values:</p> $\frac{2x+8}{x^2 - 2x - 8}$
<p>5. Simplify:</p> $\frac{-4x+8}{2-x}$	<p>6. Divide:</p> $\frac{x^2+x-6}{x^2-6x+8} \div \frac{x^2-x-12}{x^2-16}$	<p>7. Divide:</p> $\frac{a-b}{9a+9} \div \frac{a^2-b^2}{9a^2+18a+9}$	<p>8. Subtract:</p> $\frac{1}{9x^2} - \frac{8}{6x^6}$
<p>9. Subtract:</p> $\frac{2x+2}{x-5} - \frac{x+7}{x-5}$	<p>10. Add:</p> $\frac{5n+5}{5n^2+35n-40} + \frac{7n}{3n}$	<p>11. Simplify the complex fraction (HONORS)</p> $\frac{\frac{16}{m-3} - \frac{4}{m-4}}{\frac{16}{m^2} - \frac{m-4}{m-3}}$	<p>12. Express in lowest terms:</p> $\frac{2x}{x-4} - \frac{2x}{x+4} + \frac{64}{x^2-16}$
<p>13. Solve:</p> $\frac{n+5}{n+8} = 1 + \frac{6}{n+1}$	<p>14. Chad can paint the room in 2h, Cassie can paint the room in 3h, How long will it take them to paint the room together?</p>	<p>15. State the D, R, PoD, VA, and HA:</p> $\frac{x-4}{-4x-16}$	<p>16. State the D, R, PoD, VA, and HA:</p> $\frac{x^3-9x}{3x^2-6x-9}$