

Warm Up

① Simplify

$$\frac{6}{24} = \frac{\cancel{6} \cdot 1}{\cancel{6} \cdot 4}$$

$$\frac{1}{4}$$

② multiply

$$\frac{\cancel{15}}{\cancel{15}} \times \frac{\cancel{15}}{\cancel{15}}$$

$$\frac{45}{45}$$

1

OR

$$\frac{1}{1} \times \frac{1}{1}$$

1

③ Divide

$$\frac{3}{5} \div \frac{4}{25}$$

$$\frac{3}{5} \times \frac{25}{4}$$

$$\frac{75}{20} = \boxed{\frac{15}{4}}$$

Scaffolding exercises: Simplify completely

1. $\frac{8x^4}{2x^3}$

$\frac{4x}{1} = \boxed{4x}$

2. $-\frac{6ab^4}{15a^3}$

$-\frac{2b^4}{5a^2}$

3. $\frac{-9}{-24}$

4. $\frac{48(a^2)^6b^5}{(3ab)^3} = \frac{48a^{12}b^5}{27a^3b^3} = \boxed{\frac{16a^9b^2}{9}}$

One for Me

$$\frac{6x^2+7x+2}{6x^2-5x-6}$$

$$\frac{2}{3} \times \frac{4}{7}$$

Top

$$6x^2+7x+2$$

$$x^2+7x+12$$

$$(x+\frac{3}{6})(x+\frac{4}{6})$$

$$(x+\frac{1}{2})(x+\frac{2}{3})$$

$$(2x+1)(3x+2)$$

~~$$(2x+1)(3x+2)$$~~

~~$$(2x-3)(3x+2)$$~~

$$\frac{2x+1}{2x-3}$$

Bottom

$$6x^2-5x-6$$

$$x^2-5x-36$$

$$(x-9)(x+4)$$

$$(x-\frac{3}{2})(x+\frac{2}{3})$$

$$(2x-3)(3x+2)$$

~~$$\frac{-3}{9} \times \frac{4}{-6}$$~~

One for You

$$\frac{x^2-2x-3}{x^2+5x+4}$$

~~$$\frac{-3}{-3} \times \frac{1}{1}$$~~

~~$$\frac{4}{4} \times \frac{1}{5}$$~~

~~$$(x-3)(x+1)$$~~

~~$$(x+4)(x+1)$$~~

$$\frac{x-3}{x+4}$$

Step 1: Factor all numerators and denominators completely.

Step 2: Divide out common factors of the numerator and denominator

Step 3: Multiply numerators, then multiply denominators.

Step 4: Be sure the numerator and denominator have no common factors other than 1.

$$\frac{2x - x^2}{x^2 - x - 2}$$

$$\frac{3}{-3} = -1$$

$$\frac{-5}{5} = -1$$

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

$$\frac{x^2 - 6x + 8}{40 - 10x}$$

$$\frac{\overset{-1}{\cancel{(x-4)}(x-2)}}{10(4-x)}$$

(Note: A small diagram shows the factoring of $x^2 - 6x + 8$ into $(x-4)(x-2)$ with a large 'X' over it, and the numbers 8, -4, and -2 are written above the lines.)

$$\boxed{\frac{-1(x-2)}{10}}$$

$$\frac{2x^4y^5}{3x^2} \cdot \frac{15x^2}{-8x^3y^2}$$

$$\frac{30x^6y^5}{-24x^5y^2}$$

$$\boxed{\frac{5xy}{-4} \cdot 3}$$

$$\frac{6x^5y}{18x^4} \cdot \frac{9x^3y}{4y^3}$$

$$\frac{54x^8y^2}{72x^4y^3}$$

$$\boxed{\frac{3x^4}{4y}}$$

One for Me

$$\frac{x+2}{3x+12} \cdot \frac{x^2+4}{x^2-4}$$

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

$$\boxed{\frac{x^2+4}{3(x+4)(x-2)}}$$

One for You

$$\frac{x-3}{4x+20} \cdot \frac{x+5}{x^2-9}$$

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

$$\boxed{\frac{1}{4(x+3)}}$$

$$\frac{4x^3}{9y^2} \div \frac{16}{9y^5}$$

$$\frac{4x^3}{9y^2} \cdot \frac{9y^5}{16}$$

$$= \frac{36x^3y^5}{144y^2} = \boxed{\frac{1x^3y^3}{4}}$$

$$\frac{5x^4}{8x^2y^2} \div \frac{15}{8y^5}$$

$$\frac{x^2+2x+1}{x^2-3x-18}$$

$$\frac{x^2-1}{x^2-7x+6}$$

$$\frac{-18}{-6 \quad 3}$$

$$\frac{-1}{-3 \quad 3}$$

$$\frac{x+2}{x-4}$$

$$\frac{1}{3x-12}$$

$$\frac{x^2+2x+1}{x^2-3x-18} \div \frac{x^2-1}{x^2-7x+6}$$

$$\frac{x^2+2x+1}{x^2-3x-18} \cdot \frac{x^2-7x+6}{x^2-1}$$

$$\frac{(x+1)(x+1)}{(x-6)(x+3)} \cdot \frac{(x-6)(x-1)}{(x+1)(x-1)}$$

$$= \frac{x+1}{x+3}$$