Simplify: $\frac{96}{40} \div 8 = \frac{12}{5}$

or $\frac{96 \div 4}{40 \div 4} = \frac{24 \div 2}{10 \div 2} = \frac{12}{5}$

or $\frac{96 \div 2}{40 \div 2} = \frac{48 \div 2}{20 \div 2}$ $\frac{24 \div 2}{10 \div 2} = \frac{12}{5}$

Solve for Q. State restrictions on the variables.

$\frac{RQ - K}{m} = \frac{Em + K}{R}$

$R \neq 0$
$m \neq 0$

Simplify: State restrictions on the variable.

$\frac{8x^2 + 16x}{1x^2 + 7x + 10} = \frac{8x(x+2)}{(x+5)(x+2)} = \frac{8x}{x+5}$

10
5 2
7

$x \neq -5, -2$

Definition **Rational Function**

A **rational function** $f(x)$ is a function that can be written as

$$f(x) = \frac{P(x)}{Q(x)},$$

where $P(x)$ and $Q(x)$ are polynomial functions. The domain of $f(x)$ is all real numbers except those for which $Q(x) = 0$.

In simple terms-

Rational Functions:

The ratio of two polynomials.

$$f(x) = \frac{\text{Polynomial}}{\text{Polynomial}}$$

Restrictions on the variable are zeros of the denominator.

This is NOT a Rational Function, why?

$$\frac{\sqrt{x^2 - 5x + 3}}{2x - 9}$$

THIS IS NOT A POLYNOMIAL

Sec 9-4
Simplifying Rational Expressions

- Factor all numerators and denominators
- Cancel factors common to the numerator and denominator
- Restrictions are any values that make the denominator zero at any point (beginning or end)

Simplify. State restrictions on the variable.

1. $\frac{9x^2y^8}{12x^5y^3}$

$\frac{3y^5}{4x^3}$

$x \neq 0$
$y \neq 0$

2. $\frac{x^2 - 25}{x^2 - x - 20} = \frac{(x+5)(x-5)}{(x-5)(x+4)}$

-20, -5, 4, -1

$= \frac{x+5}{x+4}$

$x \neq -4, 5$