1 How To Simplify Fractions to the Lowest Term
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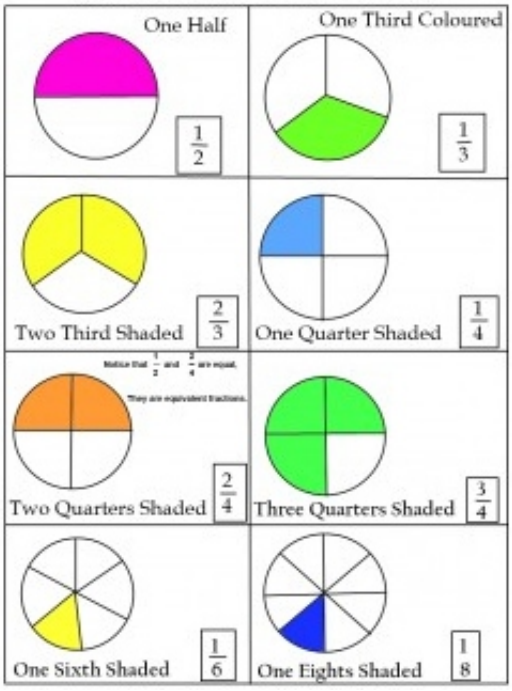

1.1 Key Words

- **Polynomials** - An expression that can have constants, variables and exponents.
  E.g. $5xy^2 - 3x + 5y^3 - 3$
- **Lowest term** - The numerator and denominator of a fraction have no common factor except number one.
  E.g. $\frac{3}{5x}$
- **Numerator** - The top part of a fraction.
- **Denominator** - The bottom part of a fraction.

1.2 Sample Question

Which of the following shows the expression $\frac{3x}{10x + x^2}$ reduced to the lowest terms?

A. $\frac{3x}{10+x}$

B. $\frac{3}{10+x}$

C. $\frac{1}{7+x}$

D. $\frac{3}{10x}$

1.3 Solution

The answer is **B**.

Steps to solve this question

1. Combine like-terms.

$$\frac{3x}{x(10+x)}$$

2. Cancel x (the common factor) in both numerator and denominator.

$$\frac{3}{10+x}$$

1.4 Steps to Solve This Kind of Problem

1. Always combine like-terms first.
2. Canceled if there is a common factor in both numerator and denominator.
3. If there's no common factor, that's the lowest term.

1.5 Challange Question

Challenge Question

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

Solution

1. Factorization

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

2. Cancel $(x+1)$ in both numerator and denominator.

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

1.6 Notes/other things to remember

- $\frac{a^m}{a^n} = a^{m-n}$
- $(a^m)^n = a^{mn}$
- $\frac{am - an}{a}$
  $= \frac{a(m-n)}{a}$
  $= m - n$
- $(x+y)^2 = x^2 + 2xy + y^2$
- $(x-y)^2 = x^2 - 2xy + y^2$
- $(x^2 - 1) = (x+1)(x-1)$
- $x^3 - 1 = (x-1)(x^2 + x + 1)$
- $x^3 + 1 = (x+1)(x^2 - x + 1)$