Fractions

$\frac{4}{5}$ ← numerator
division
denominator

No Denominator? No Problem!
Any number can be made into a fraction by adding a denominator of 1.
$6 = \frac{6}{1}$

Negative Fractions
3 Ways to Show a Fraction is Negative:
$-\frac{1}{2}$ $\frac{-1}{2}$ $\frac{1}{-2}$

Reducing

A fraction is fully reduced when the only number that divides evenly into both the numerator and the denominator is 1.

$\frac{45}{50} \div 5 = \frac{9}{10}$

$\frac{18}{72} \div 6 = \frac{3}{12} \div 3 = \frac{1}{4}$

Adding & Subtracting

We can only add and subtract fractions if they are written with the same denominator

1. Rewrite as equivalent fractions with the same denominator
2. Add or subtract the numerators
3. The denominators stays the same.
4. Simplify, if possible.

- $\frac{4}{5} + \frac{2}{5} = \frac{6}{5}$
- $\frac{4 \cdot 2}{7 \cdot 2} - \frac{1 \cdot 7}{2 \cdot 7} = \frac{8}{14} - \frac{7}{14} = \frac{1}{14}$
- $\frac{3 \cdot 9}{1 \cdot 9} + \frac{2}{9} = \frac{27}{9} + \frac{2}{9} = \frac{29}{9}$

Multiplying

We can multiply fractions with any denominator

1. Multiply the numerator.
2. Multiply the denominator.
3. Simplify, if possible.

- $\frac{6}{7} \cdot \frac{2}{3} = \frac{12}{21} \div 3 = \frac{4}{7}$
- $\frac{4}{5} \cdot \frac{3}{8} = \frac{12}{40} \div 2 = \frac{6}{20} \div 2 = \frac{3}{10}$

Dividing

We can divide fractions by rewriting as a multiplying **problem.**

1. The first fraction stays the same
2. Division becomes multiplication.
3. Flip (Take the reciprocal of) the second fraction.
4. Follow the rules for multiplying.

* Keep, change, Flip!

- $\frac{3}{4} \div \frac{1}{2}$ $\frac{3}{2} \cdot \frac{2}{1} = \frac{3}{2}$
- $\frac{2/3}{4/5}$ $\frac{1}{2/3} \cdot \frac{5}{4_2} = \frac{5}{6}$

Solving Equations

We use inverse operations to solve equations.

- **INVERSE OPERATIONS:** operations that undo each other

addition + ↔ subtraction − ; multiplication $a \cdot b$ ↔ division a/b ; square x^2 ↔ square root $\sqrt{x}$

RECOGNIZING ADDITION

positive # by itself
$x + 3$
$3 + x$

RECOGNIZING SUBTRACTION

Term with a negative or subtraction in front
$x - 6$ or $-6 + x$

RECOGNIZING MULTIPLICATION

Number & variable side by side
$7x$

Examples: Solve for the indicated variable.

SADMEP

1. $5x - 4 = 26$

$+4 \quad +4$

$\frac{5x}{5} = \frac{30}{5}$

$x = 6$

2. $\frac{5(x+7)}{3} = 20 \cdot 3$

$5(x+7) = 60$

$5x + 35 = 60$

$-35 \quad -35$

$\frac{5x}{5} = \frac{25}{5}$

$x = 5$

3. $8 + 5c = 7c - 2$

$-5c \quad -5c$

$8 = 2c - 2$

$+2 \quad +2$

$\frac{10}{2} = \frac{2c}{2}$

$c = 5$

4. $9 + 3.5g = 11 - 0.5g$

$+0.5g \quad +0.5g$

$9 + 4g = 11$

$-9 \quad -9$

$\frac{4g}{4} = \frac{2}{4}$

$g = 1/2$