

Addition and Subtraction of Fractions

1. Illustration of basic concepts, see pictures in text. Also use this website <http://www.coolmath.com/fractions/index.html>

2. Standard algorithms

$$\frac{a}{b} + \frac{c}{d} = \frac{a \cdot d + b \cdot c}{b \cdot d}$$

3. Properties of addition

Closure

Commutative

Associative

Identity is $\frac{0}{b}$

4. Mental math and estimation

Multiplication and Division of Fractions

1. Illustration of multiplication, see pictures in text. Also use this website <http://www.coolmath.com/fractions/index.html>

2. Standard algorithms

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d} \quad \text{and} \quad \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{a \cdot d}{b \cdot c}$$

3. Properties of multiplication

Closure

Commutative

Associative

Identity is $\frac{1}{1}$

New property: Multiplicative Inverse (reciprocal)

For every nonzero fraction $\frac{a}{b}$, there is a unique fraction $\frac{b}{a}$,

such that, $\frac{a}{b} \cdot \frac{b}{a} = 1$

4. Mental math and estimation