Adding Fractions

With the same denominator:

Add the **numerators** only. Keep the denominator the same e.g.

$$\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

With different denominators:

1. Find the **lowest common multiple** that both **denominators** go into and **multiply** the fractions as necessary: "what you do to the top, you do to the bottom top!"
2. **Re-write our calculation** with the same common denominator.
3. **Add** our **numerators** together
4. **Simplify**

$$\frac{2}{15} + \frac{3}{5} = ?$$

$$\frac{2}{15} + \frac{3 \times 3}{5 \times 3}$$

$$\frac{2}{15} + \frac{9}{15} = \frac{2+9}{15} = \frac{11}{15}$$

Same

Multiplying Fractions

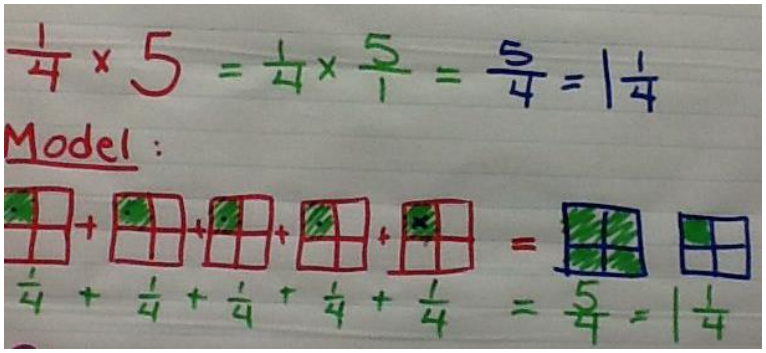
Fractions X Fractions:

1. **Multiply** the **numerators**
2. **Multiply** the **denominators**
3. **Simplify** the fraction

$$\frac{2}{5} \times \frac{3}{7} = \frac{6}{35}$$

Fractions X Whole numbers:

1. Make your **whole number a fraction** by placing it over the **denominator 1**
2. **Multiply** the **numerators**
3. **Multiply** the **denominators**
4. **Simplify** the fraction



Ordering Fractions

To accurately order fractions you must:

1. Make them **equivalent fractions first** by finding the **lowest common multiple** for all denominators.

2. **Multiply** the fractions where appropriate to convert them into equivalent fractions ("what you do to the top, you do to the bottom!")
3. **Order** the fractions from **smallest to largest**
3. Order them in their **original form**, not their converted form.

$\frac{1}{2}$	$\frac{3}{4}$	$\frac{2}{6}$	$\frac{2}{3}$
$\frac{1}{2}$ x6 → $\frac{6}{12}$	$\frac{3}{4}$ x3 → $\frac{9}{12}$	$\frac{2}{6}$ x2 → $\frac{4}{12}$	$\frac{2}{3}$ x4 → $\frac{8}{12}$
$\frac{2}{6}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{4}$
$\frac{4}{12}$	$\frac{6}{12}$	$\frac{8}{12}$	$\frac{9}{12}$

Dividing Fractions

$$\frac{2}{3} \div \frac{4}{5} = \frac{2}{3} \times \frac{5}{4}$$

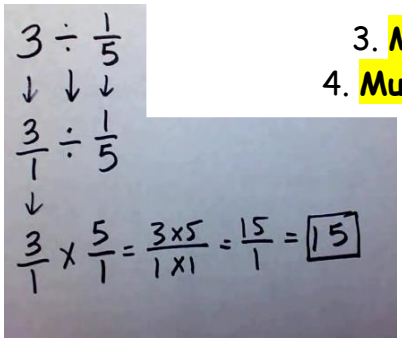
$$= \frac{2 \times 5}{3 \times 4}$$

$$= \frac{10}{12}$$

$$= \frac{5}{6}$$

Fractions divided by Fractions:

1. Flip the numerator and the denominator on the **second fraction only** (the reciprocal)
2. **Multiply** the **numerators**
3. **Multiply** the **denominators**
3. **Simplify** the fraction



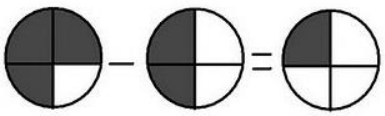
Fractions divided by Whole Numbers:

1. Make your **whole number a fraction** by placing it over the **denominator 1**
2. Flip the numerator and the denominator on the **second fraction only** (the reciprocal)
3. **Multiply** the **numerators**
4. **Multiply** the **denominators**

Subtracting Fractions

With the same denominator:

Subtract the **numerators** only. Keep the denominator the same e.g.



$$\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$$

With different denominators:

1. Find the **lowest common multiple** that both **denominators** go into and **multiply** the fractions where needed
2. **Re-write our sum** with the same denominator.
3. **Subtract** our **numerators** in the same way as before
4. **Simplify**