# Fractions Handout

## Adding & Subtracting Fractions

In order to add or subtract fractions, the denominators have to be the same.
When the denominators are the same, then we can add/subtract.

$$\frac{1}{2} + \frac{5}{3} \qquad \frac{numerator}{denominator}$$

**Step 1**: **Find the Lowest Common Denominator (LCD**)
Find the LCD by figuring out the Least Common Multiple (LCM).  For example:

$$\frac{1}{2} + \frac{5}{3} \qquad\qquad 2 \bullet 3 = 6 \quad \text{Thus the LCD = 6}$$

**Step 2**: **Multiply numerator and denominator by the number you used to make the LCD.**

Here we use "3" because 3 • 2 = 6 : → $\left(\frac{3}{3}\right)\frac{1}{2} + \frac{5}{3}\left(\frac{2}{2}\right)$ ← Here we use "2" because 2 • 3 = 6

After we multiply everything, we end up with this: $\frac{3}{6} + \frac{10}{6}$

**Step 3: Add/Subtract numerators together and keep denominators the same**.

$$\left(\frac{3}{3}\right)\frac{1}{2} + \frac{5}{3}\left(\frac{2}{2}\right) = \frac{3}{6} + \frac{10}{6} = \frac{13}{6}$$

Reduce if possible; if not, you are done!

## Multiplying Fractions

When multiplying fractions, multiply straight across. Reduce if possible.

**Example 1:** $\quad \frac{2}{3} \quad \bullet \quad \frac{4}{7} = \frac{2 \bullet 4}{3 \bullet 7} = \frac{8}{21}$

**Example 2:** $\quad \frac{3}{4} \bullet \frac{2}{3} = \frac{6}{12} = \frac{6 \bullet 1}{6 \bullet 2} = \frac{1}{2}$
Both have a factor of six that cancels out.

## Dividing Fractions

Flip & Multiply

$$\frac{4}{3} \div \frac{2}{5} = \frac{4}{3} \bullet \frac{5}{2} = \frac{20}{6} = \frac{10}{3} \bullet \frac{2}{2} = \frac{10}{3}$$

We flip the second fraction, then multiply straight across. Then reduce, both have a factor of 2 that cancels out.

## Clearing Fractions

We can <u>ONLY</u> clear fractions when there is an equal sign.

$$\text{Equation: } \frac{3}{2} + X = \frac{1}{4}$$

**Step 1**: **Find the LCD** $\quad \frac{3}{2} + \frac{X}{1} = \frac{1}{4} \quad$ LCD = 4

**Step 2**: Multiply everything by LCD, clear the fractions, & then reduce:

$$\frac{4}{1} \bullet \left(\frac{3}{2}\right) + \left(\frac{X}{1}\right) \bullet \frac{4}{1} = \left(\frac{1}{4}\right) \bullet \frac{4}{1}$$
$$(2)\, 3 + 4(X) = 1$$

Simplify and Solve      6 + 4X = 1

Subtract 6 from both sides
$$6 + 4X = 1$$
$$\underline{-6 \quad\quad -6}$$
$$4x = -5$$

Divide by 4 on both sides to isolate the X: $\quad \frac{4x}{4} = \frac{-5}{4}$  X = - $\frac{5}{4}$