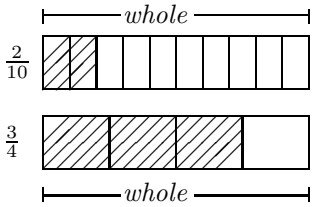
Math 210 - Dr. Miller - Summary #5: Comparing Fractions

Five methods can be used to compare fractions. They're demonstrated below on $\frac{2}{10}$ and $\frac{3}{4}$, from most elementary to most sophisticated:

1. Draw pictures in **IDENTICAL** wholes: (This is useful only for small denominators and numerators.)



$\frac{3}{4}$ shades more OF THE WHOLE, so $\frac{3}{4} > \frac{2}{10}$.

2. Compare to familiar or benchmark numbers: (Younger pupils often compare to 0, 1/2, or 1. Older learners might use 1/3, 2/3, and 1/4, 3/4 also.)

$\frac{2}{10}$ is close to 0 while $\frac{3}{4}$ is close to 1, so $\frac{3}{4} > \frac{2}{10}$.
...or...
$\frac{2}{10}$ is less than $\frac{1}{2}$ but $\frac{3}{4}$ is more than $\frac{1}{2}$, so $\frac{3}{4} > \frac{2}{10}$.

3. Reason about the meanings of the numerators **AND** denominators: (The conclusions MUST agree.)

$\frac{3}{4}$ keeps more pieces than $\frac{2}{10}$ does (3 pieces vs. 2, so 3/4 seems like more) and $\frac{3}{4}$ has larger pieces (4ths are fatter than 10ths, so again 3/4 seems like more), so $\frac{3}{4} > \frac{2}{10}$.

4. Rewrite using common denominators: (Then just compare numerators.)

$\frac{2}{10} = \frac{4}{20}$ and $\frac{3}{4} = \frac{15}{20}$ and 15 of something is more than 4 of those same things, so $\frac{3}{4} > \frac{2}{10}$.

5. Cross-multiply: (This is a short-cut for Method #4.)

$$\frac{2}{10} \quad \textit{vs.} \quad \frac{3}{4}$$

(*write product on numerator's side*) $2 \cdot 4 \qquad 3 \cdot 10$ (*write product on numerator's side*)

$$8 < 30$$

means

$$\frac{2}{10} < \frac{3}{4}.$$