Order and Compare Fractions

Equivalent Fractions have the same value, even though they may look different.
These fractions are really the same:

$$\frac{1}{3}=\frac{2}{6}=\frac{3}{9}$$

Why are they the same?

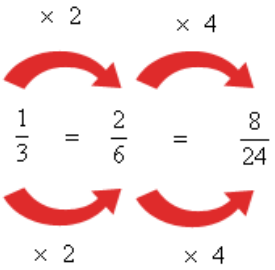
Because when you multiply or divide **both** the top and bottom by the same number, the fraction keeps its value.

The rule to remember is:

You can multiply or divide the numerator and the denominator by the same number to obtain equivalent fractions

So, here is why those fractions are really the same:

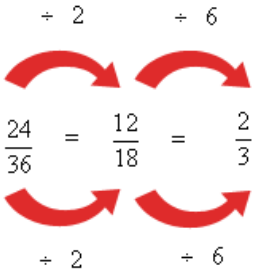
$$\frac{1}{3}=\frac{2}{6}=\frac{8}{24}$$



Dividing

Here are some more equivalent fractions, this time by dividing:

$$\frac{24}{36}=\frac{12}{18}=\frac{2}{3}$$



Examples:

A- Write two equivalent fractions for each.

1) $\frac{2}{7}$

$\frac{2}{7}=\frac{4}{14}$ multiply up and down 2

$\frac{2}{7}=\frac{6}{21}$ multiply up and down 3

2) $\frac{4}{16}$

$\frac{4}{16}=\frac{2}{8}$ divide up and down by 2

$\frac{4}{16}=\frac{1}{4}$ divide up and down by 4

3) $\frac{1}{9}$

$\frac{1}{9}=\frac{2}{18}$ multiply up and down by 2

$\frac{1}{9}=\frac{5}{45}$ multiply up and down by 5

B- Find the missing numerator or denominator.

4) $\frac{3}{7}=\frac{18}{\quad}$

$\frac{3}{7}=\frac{18}{\quad}$ to obtain 18 from 3 we multiply by 6

so, the missing denominator = $7\times 6=42$

$\Rightarrow \frac{3}{7}=\frac{18}{42}$

5) $\frac{9}{11}=\frac{45}{\quad}$

$\frac{9}{11}=\frac{45}{\quad}$ to obtain 45 from 9 we multiply by 5

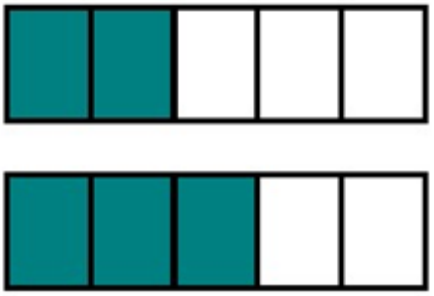
so, the missing denominator = $11\times 5=55$

$\Rightarrow \frac{9}{11}=\frac{45}{55}$

You can compare and order fractions that have the same denominators.

Compare $\frac{2}{5}$ and $\frac{3}{5}$

Compare the shaded areas in the fraction model. $\frac{2}{5}$ $\frac{3}{5}$

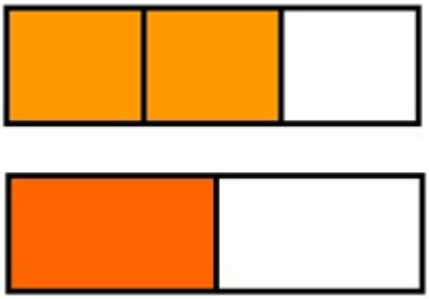


$2 < 3$, so $\frac{2}{5} < \frac{3}{5}$

You can also compare fractions that have different denominators.

Compare $\frac{2}{3}$ and $\frac{1}{2}$

Compare the shaded areas in the fraction model. $\frac{2}{3}$ $\frac{1}{2}$



Since $\frac{2}{3}$ has a larger shaded area,

$\frac{2}{3} > \frac{1}{2}$

Examples:

C- Order the fractions from least to greatest.

6) $\frac{2}{4}, \frac{2}{6}, \frac{2}{10}$

$\frac{2}{4}, \frac{2}{6}, \frac{2}{10}$

Compare the numerators: 2=2=2

Compare the denominators: 4<6<10

$\Rightarrow \frac{2}{10}, \frac{2}{4}, \frac{2}{6}$

7) $\frac{3}{5},\frac{4}{9},\frac{7}{45}$

$\frac{3}{5},\frac{4}{9},\frac{7}{45}$

Compare the numerators: all different

Compare the denominators: all different

So,here we need to wirte the equivalent fractions to compare

$$\left.\begin{array}{l}\frac{3}{5}=\frac{27}{45}\\ \frac{4}{9}=\frac{20}{45}\\ \frac{7}{45}\end{array}\right\} 27>20>7 \Rightarrow \frac{27}{45}>\frac{20}{45}>\frac{7}{45}$$

$$\Rightarrow \frac{7}{45},\frac{4}{9},\frac{3}{5}$$

8) $\frac{5}{8},\frac{3}{4},\frac{1}{6}$

$\frac{5}{8},\frac{3}{4},\frac{1}{6}$

Compare the numerators: all different

Compare the denominators: all different

So,here we need to wirte the equivalent fractions to compare

$$\left.\begin{array}{l}\frac{5}{8}=\frac{15}{24}\\ \frac{1}{6}=\frac{4}{24}\\ \frac{3}{4}=\frac{18}{24}\end{array}\right\} 18>15>4 \Rightarrow \frac{18}{24}>\frac{15}{24}>\frac{4}{24}$$

$$\Rightarrow \frac{1}{6},\frac{5}{8},\frac{3}{4}$$