

Fraction (2) – Ordering the Fractions

Classic Example

(a) Arrange the fractions below in descending order.

$$\frac{2}{3}, \frac{5}{9}, \frac{7}{12}$$

(b) Arrange the fractions beginning with the greatest.

$$\frac{7}{10}, \frac{4}{5}, \frac{3}{4}$$

Solution

(a) **Method 1: Two Fractions at a Time**

First, compare $\frac{2}{3}$ and $\frac{5}{9}$ as it is easy to change $\frac{2}{3}$ to $\frac{6}{9}$.

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

Clearly, $\frac{6}{9} > \frac{5}{9}$.

Comment

In maths, “>” means “greater than”.

Next, compare $\frac{5}{9}$ and $\frac{7}{12}$.

The lowest common multiple of 9 and 12 (or the first number that is divisible by both 9 and 12) is 36.

$$\frac{5 \times 4}{9 \times 4} = \frac{20}{36}$$

$$\frac{7 \times 3}{12 \times 3} = \frac{21}{36}$$

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Clearly, $\frac{21}{36} > \frac{20}{36}$, or $\frac{7}{12} > \frac{5}{9}$.

Now, compare $\frac{2}{3}$ and $\frac{7}{12}$.

$$\frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

Clearly, $\frac{8}{12} > \frac{7}{12}$.

So, $\frac{2}{3} > \frac{7}{12} > \frac{5}{9}$.

Ans: $\frac{2}{3}$, $\frac{7}{12}$, $\frac{5}{9}$

Method 2: Change to Identical Denominator

The lowest common multiple of 3, 9 and 12 is 36.

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

$$\frac{5 \times 4}{9 \times 4} = \frac{20}{36}$$

$$\frac{7 \times 3}{12 \times 3} = \frac{21}{36}$$

Clearly, $\frac{24}{36} > \frac{21}{36} > \frac{20}{36}$.

Ans: $\frac{2}{3}$, $\frac{7}{12}$, $\frac{5}{9}$

Method 3: Inverse the Fractions

Inversing $\frac{2}{3}$, we get $\frac{3}{2} = 1\frac{1}{2}$.

Inversing $\frac{7}{12}$, we get $\frac{12}{7} = 1\frac{5}{7}$.

Clearly, $1\frac{5}{7} = 1\frac{10}{14}$ is greater than $1\frac{1}{2} = 1\frac{7}{14}$,

which means the converse is true.

So, we have $\frac{2}{3} > \frac{7}{12}$.

Now inversing $\frac{5}{9}$, we get $\frac{9}{5} = 1\frac{4}{5}$.

Compare $1\frac{5}{7}$ and $1\frac{4}{5}$.

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$$\frac{5 \times 5}{7 \times 5} = \frac{25}{35}$$

$$\frac{4 \times 7}{5 \times 7} = \frac{28}{35}$$

$1\frac{4}{5}$ is greater than $1\frac{5}{7}$.

So, the converse is true: $\frac{7}{12} > \frac{5}{9}$.

Method 4: Change to Identical Numerator

The common multiple of 2, 5 and 7 is 70.

$$\frac{2 \times 35}{3 \times 35} = \frac{70}{105}$$

$$\frac{5 \times 14}{9 \times 14} = \frac{70}{126}$$

$$\frac{7 \times 10}{12 \times 10} = \frac{70}{120}$$

Clearly, $\frac{70}{105} > \frac{70}{120} > \frac{70}{126}$.

Or $\frac{2}{3} > \frac{7}{12} > \frac{5}{9}$

Ans: $\frac{2}{3}, \frac{7}{12}, \frac{5}{9}$

(b) **Method 1: Two Fractions at a Time**

First, $\frac{7}{10}, \frac{4}{5}$

→ $\frac{7}{10}, \frac{8}{10}$

Clearly, $\frac{8}{10} > \frac{7}{10}$.

Or $\frac{4}{5} > \frac{7}{10}$

Next, compare $\frac{7}{10}$ and $\frac{3}{4}$.

The lowest common multiple is 20.

$$\frac{7 \times 2}{10 \times 2} = \frac{14}{20}$$

$$\frac{3 \times 5}{4 \times 5} = \frac{15}{20}$$

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Clearly, $\frac{15}{20} > \frac{14}{20}$ or $\frac{3}{4} > \frac{7}{10}$.

Now, compare $\frac{4}{5}$ and $\frac{3}{4}$.

The lowest common multiple is also 20.

$$\frac{4 \times 4}{4 \times 5} = \frac{16}{20}$$

Clearly, $\frac{16}{25} > \frac{15}{20}$ or $\frac{4}{5} > \frac{3}{4}$.

Method 2: Change to Identical Denominator.

First, 20 is divisible by 4, 5 and 10.

→ lowest common multiple

$$\frac{7}{10} = \frac{7 \times 2}{10 \times 2} = \frac{14}{20}$$

$$\frac{4}{5} = \frac{4 \times 4}{5 \times 4} = \frac{16}{20}$$

$$\frac{3}{4} = \frac{3 \times 5}{4 \times 5} = \frac{15}{20}$$

Clearly, $\frac{16}{20} > \frac{15}{20} > \frac{14}{20}$.

Or $\frac{4}{5} > \frac{3}{4} > \frac{7}{10}$

Ans: $\frac{4}{5}, \frac{3}{4}, \frac{7}{10}$

Method 3: Inverse the Fractions

$$\frac{7}{10} \rightarrow \frac{10}{7} = 1\frac{3}{7}$$

$$\frac{4}{5} \rightarrow \frac{5}{4} = 1\frac{1}{4}$$

$$\frac{3}{4} \rightarrow \frac{4}{3} = 1\frac{1}{3}$$

Compare $\frac{3}{7}$ and $\frac{1}{3}$.

$$\frac{9}{21} > \frac{7}{21}$$

$$\text{So } \frac{3}{7} > \frac{1}{3} > \frac{1}{4},$$

which means the converse is true.

We have $\frac{4}{5} > \frac{3}{4} > \frac{7}{10}$.

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Method 4: Change to Identical numerator

The common multiple of 3, 4 and 7 is 84 ($= 3 \times 4 \times 7$).

$$\frac{7 \times 12}{10 \times 12} = \frac{84}{120}$$

$$\frac{4 \times 21}{5 \times 21} = \frac{84}{105}$$

$$\frac{3 \times 28}{4 \times 28} = \frac{84}{112}$$

Clearly, $\frac{84}{105} > \frac{84}{112} > \frac{84}{120}$.

Ans: $\frac{4}{5}, \frac{3}{4}, \frac{7}{10}$

1. (a) Arrange the following fractions from the greatest to the smallest.

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

Ans: _____

- (b) Arrange the fractions in order, beginning with the greatest.

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

Ans: _____

2. Which group of fractions is arranged in order, beginning with the greatest?

$$\frac{7}{9}, \frac{2}{3}, \frac{13}{18}$$

$$\frac{2}{3}, \frac{7}{9}, \frac{13}{18}$$

$$\frac{7}{9}, \frac{13}{18}, \frac{2}{3}$$

$$\frac{13}{18}, \frac{7}{9}, \frac{2}{3}$$

Ans: _____

Solutions to

Fraction (2) – Ordering the Fractions

1. (a) The common multiple of 3, 6 and 9 is 18.

$$\frac{3 \times 3}{6 \times 3} = \frac{9}{18}$$

$$\frac{1 \times 6}{3 \times 6} = \frac{6}{18}$$

$$\frac{2 \times 2}{9 \times 2} = \frac{4}{18}$$

$$\text{Ans: } \frac{3}{6}, \frac{1}{3}, \frac{2}{9}$$

- (b) Change all denominators to 40.

$$\frac{3 \times 10}{4 \times 10} = \frac{30}{40}$$

$$\frac{5 \times 5}{8 \times 5} = \frac{25}{40}$$

$$\frac{4 \times 8}{5 \times 8} = \frac{32}{40}$$

$$\text{Clearly, } \frac{32}{40} > \frac{30}{40} > \frac{25}{40}.$$

$$\text{Ans: } \frac{4}{5}, \frac{3}{4}, \frac{5}{8}$$

2. Try the 3rd group.

$$\frac{7 \times 2}{9 \times 2} = \frac{14}{18}$$

$$\frac{2 \times 6}{3 \times 6} = \frac{12}{18}$$

$$\text{Ans: } \frac{7}{9}, \frac{13}{18}, \frac{2}{3}$$

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