Comparing Ratios Guide Notes

Comparison of Ratios

A ratio is a comparison of two quantities. To compare ratios is to determine whether the two given ratios are equal or not, and if one is greater or lesser than the other. This is very helpful in making decisions in real life situations. These comparisons can be obtained using different methods.

Which is greater?

3:4   or   2:3

Method 1: COMPARING BY CROSS MULTIPLICATION

Remember that ratios can be written as fractions, so one way to compare them is through the process of cross multiplying.

Step 1: Rewrite the ratios into fractions.

$3:4 \longrightarrow \frac{3}{4}$

$2:3 \longrightarrow \frac{2}{3}$

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Step 2: Cross Multiply

$$\frac{3}{4} \quad \diagdown\!\!\!\!\diagup \quad \frac{2}{3}$$

(3)(3) (4)(2)

9 > 8

9 is greater than 8, therefore 3:4 is greater than 2:3.

Sample Problem 1:

Compare the ratios 11:15 and 12:13 by cross multiplying.

Solution: $\frac{11}{15} \quad \diagdown\!\!\!\!\diagup \quad \frac{12}{13}$

(11)(13)   (15)(12)

143 < 180

143 is less than 180, therefore 11:15 is less than 12:13

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Which is greater?

| 3:4 | or | 2:3 |

Method 2: COMPARING BY CHANGING THE RATIOS INTO SIMILAR FRACTIONS

Remember that similar fractions are fractions having the same denominators. In similar fractions, the bigger the numerator, the bigger the fraction.

Step 1: Rewrite the ratios into fractions.

$3:4 \longrightarrow \frac{3}{4}$

$2:3 \longrightarrow \frac{2}{3}$

Step 2: Change the fractions into similar fractions.

HOW DO WE DO THAT???

a. Find the LCM of the denominators

$\frac{3}{4}$ and $\frac{2}{3}$ The LCM of 4 and 3 is 12.

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b. Divide the LCM by the denominator, then multiply the quotient to the numerator.

$$\frac{3}{4}$$

LCM = 12

12/4 = 3

(3)(3) = 9

$$\frac{3}{4} \longrightarrow \frac{9}{12}$$

$$\frac{2}{3}$$

LCM = 12

12/3 = 4

(2)(4) = 8

$$\frac{2}{3} \longrightarrow \frac{8}{12}$$

c. Remember that when fractions are similar, **the bigger the numerator, the bigger the fraction.** So…

$\frac{9}{12}$ **is greater than** $\frac{8}{12}$, **therefore 3:4 is greater than 2:3.**

Sample Problem 2:

Compare the ratios 4:5 and 1:3 by changing them into similar fractions.

Solution:

LCM = 15

4:5 $\longrightarrow \frac{4}{5} \longrightarrow \frac{12}{15}$

1:3 $\longrightarrow \frac{1}{3} \longrightarrow \frac{5}{15}$

$\frac{12}{15}$ is greater than $\frac{5}{15}$, therefore, 4:5 is greater than 1:3.

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Which is greater?

$$3:4 \quad \text{or} \quad 2:3$$

Method 3: COMPARING BY DETERMINING THE UNIT RATE

Remember that unit rate is a rate where the second term of the ratio (or the denominator of a fraction) is equal to "1". Or to make it simpler, we get the quotient of the terms of a ratio (or the quotient of the numerator and denominator of a ratio expressed as a fraction).

Step 1: Express the given ratios in fraction form.

$3:4 \longrightarrow \frac{3}{4}$

$2:3 \longrightarrow \frac{2}{3}$

Step 2: Find the unit rate of each ratio. (Divide the numerator and the denominator of the fractions to make the denominator equal to 1.

$3:4 \longrightarrow \frac{3 \div 4}{4 \div 4} \longrightarrow \frac{3 \div 4}{1} \longrightarrow \frac{0.75}{1} = 0.75$

$2:3 \longrightarrow \frac{2 \div 3}{3 \div 3} \longrightarrow \frac{2 \div 3}{1} \longrightarrow \frac{0.67}{1} = 0.67$

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Or… we can just divide the terms directly.

$$3:4 \longrightarrow 3 \div 4 = 0.75$$

$$2:3 \longrightarrow 2 \div 3 = 0.67$$

0.75 is greater than 0.67, therefore 3:4 is greater than 2:3.

Sample Problem 3:

Compare the ratios 4:3 and 7:5 by determining the unit rate.

Solution:

$$4:3 \longrightarrow \frac{4 \div 3}{3 \div 3} \longrightarrow \frac{4 \div 3}{1} \longrightarrow \frac{1.33}{1} = 1.33$$

$$7:5 \longrightarrow \frac{7 \div 5}{5 \div 5} \longrightarrow \frac{7 \div 5}{1} \longrightarrow \frac{1.4}{1} = 1.4$$

1.4 is greater than 1.33, therefore 7:5 is greater than 4:3.