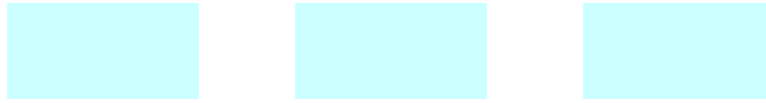


RATIOS AND PROPORTIONS Guide Notes

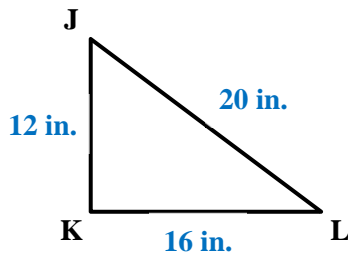
RATIO is a comparison of a number a and b using division, where $b \neq 0$. It is usually expressed in simplest form and can be expressed as:



EXTENDED RATIOS are ratios that can be used to compare three or more quantities.



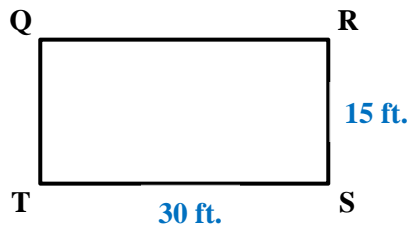
Example: Express ratio of sides of the triangle in simplest form.



$$\overline{JK} : \overline{KL} : \overline{JL}$$

EQUIVALENT RATIOS are ratios that have the same simplified form.

Example: Express ratio of width and height of the rectangle in simplest form.



$$\frac{\text{width of the rectangle}}{\text{height of the rectangle}} =$$

Sample Problem 1: Simplify.

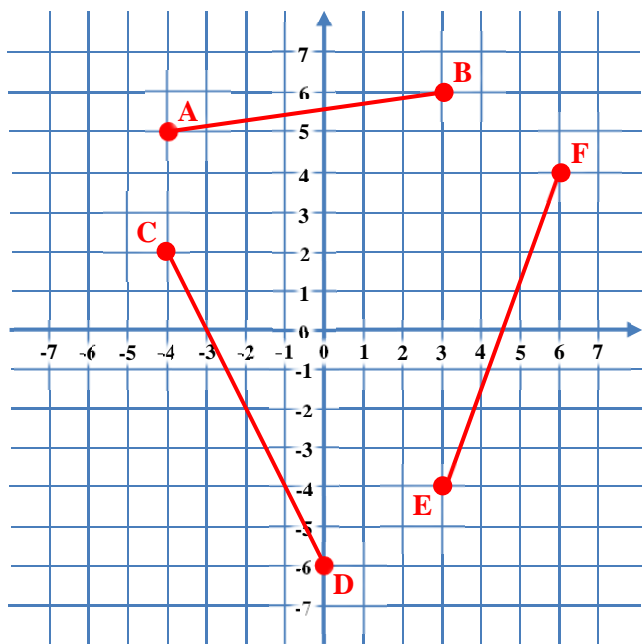
a. 35 to 7

b. 45:63

c. $\frac{39}{13}$

RATIOS AND PROPORTIONS Guide Notes

Sample Problem 2: Write the ratio expressing the slope of each line segment.

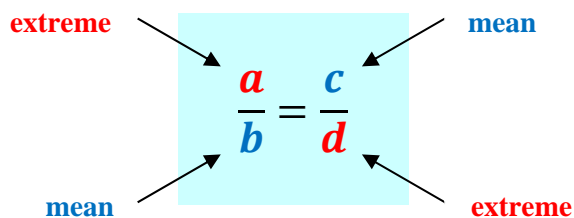


a. $m_{\overline{AB}}$

b. $m_{\overline{CD}}$

c. $m_{\overline{EF}}$

PROPORTION is an equation stating that two ratios are equal.



Extremes are the first and last positions in the proportion.

Means are the two middle positions in the proportion.

Sample Problem 3: Solve each proportion.

a. $\frac{x}{11} = \frac{8}{-16}$

b. $\frac{-6}{9} = \frac{8}{2y+7}$

c. $\frac{n+4}{3} = \frac{5n}{6}$

d. $\frac{z+2}{11} = \frac{z-2}{15}$

RATIOS AND PROPORTIONS Guide Notes

PROPERTIES OF PROPORTIONS

A. Cross Products Property

In a proportion, the product of the extremes is equal to the product of the means.

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } = bc. \quad (b \neq 0 \text{ and } d \neq 0)$$

B. Reciprocal Property

If two ratios are equal, then their reciprocals are also equal.

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } \frac{b}{a} = \frac{d}{c}. \quad (a \neq 0 \text{ and } c \neq 0)$$

C. If you interchange the means of a proportion, then you form another true proportion.

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } \frac{a}{c} = \frac{b}{d}. \quad (c \neq 0 \text{ and } d \neq 0)$$

D. In a proportion, if you add the value of each ratio's denominator to its numerator, then you form another true proportion.

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } \frac{a+b}{b} = \frac{c+d}{d}. \quad (b \neq 0 \text{ and } d \neq 0)$$

Sample Problem 4: Solve each proportion.

a. $\frac{3}{7} = \frac{x}{49}$

b. $\frac{2n}{25} = \frac{10}{5n}$

c. $\frac{s}{8} = \frac{16}{2}$

d. $\frac{y+2}{4} = \frac{16}{y+2}$