

Ratio and Percent Word Problems

If two numbers are in the ratio a to b we can express that ratio as $\frac{ax}{bx}$.

Why? the x cancels and we are back to $\frac{a}{b}$.

When dealing with ratio word problems we will want to express a ratio such as $7:5$ as $7x$ and $5x$. This will account for the possibility of the ratio being reduced.

Ex) Two numbers are in the ratio 7 to 5 , and their sum is 30 . find the numbers.

$$\text{Num 1} : \text{Num 2} = 7:5 = 7x:5x$$

$$\text{Num 1} = 7x \rightarrow 7 \cdot \frac{5}{2} = \frac{35}{2}$$

$$\text{Num 2} = 5x \rightarrow 5 \cdot \frac{5}{2} = \frac{25}{2}$$

$$7x + 5x = 30 \quad \text{Solve}$$

$$12x = 30 \quad \text{Divide by } 12 \text{ (C.L.T.)}$$

$$x = \frac{30}{12} = \frac{10}{4} = \frac{5}{2} \quad \text{Divide, Red}$$

Ex) The width and length of a rectangle are on the ratio 5:3 and its perimeter is 48 ft. find length and width.

$$\text{width : length} = 5:3 = 5x:3x$$

$$P = l + l + w + w$$

$$48 = 3x + 3x + 5x + 5x$$

$$48 = 16x$$

$$3 = x$$

$$\text{Width} = 5x = 5 \cdot 3 = 15$$

$$\text{length} = 3x = 3 \cdot 3 = 9$$

Ex) A number is such that if 10% of it is increased by 17, the result is equal to 95% of the original number.

let x = the number

$$(10\% \cdot x) + 17 = 95\% \cdot x$$

$$\frac{10}{100}x + 17 = \frac{95}{100}x$$

$$17 = \frac{85}{100}x$$

$$1700 = 85x$$

$$20 = x$$