Topic: Ratios and proportions

Question: Two numbers have a ratio of 4 to 7 and a sum of 99. What are the two numbers?

Answer choices:

A 4 and 7

B 25 and 74

C 36 and 63

D 30 and 69

Solution: C

Let's call the two numbers x and y and set up a ratio.

$$\frac{x}{y} = \frac{4}{7}$$

Solve for a variable by cross multiplying.

$$7x = 4y$$

$$x = \frac{4}{7}y$$

Set up an equation for the sum of the two numbers.

$$x + y = 99$$

Use substitution and plug $(4/7)y$ in for x.

$$\frac{4}{7}y + y = 99$$

$$\frac{4}{7}y + \frac{7}{7}y = 99$$

$$\frac{11}{7}y = 99$$

$$y = \frac{99 \cdot 7}{11}$$

$$y = 63$$

Now use $x = (4/7)y$ to solve for x.

$$x = \frac{4}{7}(63)$$

$$x = 4(9)$$

$$x = 36$$

The two numbers are 36 and 63.

Topic: Ratios and proportions

Question: If there are 15 girls and 6 boys in a class, what is the ratio of boys to girls?

Answer choices:

A $\frac{21}{15}$

B $\frac{2}{5}$

C $\frac{15}{6}$

D $\frac{5}{2}$

Solution: B

There are 15 girls and 6 boys in a class. We're looking for the ratio of boys to girls, which means we'll need to find the fraction

$$\frac{\text{boys}}{\text{girls}}$$

So we get

$$\frac{6}{15}$$

We need to simplify the ratio to lowest terms.

$$\frac{3(2)}{3(5)}$$

$$\frac{2}{5}$$

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Question: If there are 15 girls and 6 boys in a class, then the ratio of boys to girls is $6/15$. If I want to keep this ratio, how many girls will there be in a class with 18 boys?

Answer choices:

A 30

B 15

C 60

D 45

Solution: D

The ratio of boys to girls is given as $6/15$. If instead we have a class of 18 boys and we want to keep the ratio of boys to girls at $6/15$, we'll let x be the unknown (the number of girls in a class where there are 18 boys) and set up the proportion

$$\frac{6}{15} = \frac{18}{x}$$

Then we'll solve this for x, by cross multiplying.

$$6x = 18(15)$$

Divide both sides by 6, and then factor the 18 in the numerator as $6(3)$, so that we can cancel a 6 out of the numerator and denominator.

$$x = \frac{18(15)}{6}$$

$$x = \frac{6(3)(15)}{6}$$

$$x = (3)(15)$$

$$x = 45$$