

Ratio & Proportion Problem Solving

Combining Ratios & Fractional Reasoning

I Do

There are only red counters, blue counters, and yellow counters in a bag.

The ratio of red counters to blue counters is 3:4.

The ratio of blue counters to yellow counters is 2:5.

Sam says, "Exactly half of the counters in the bag are yellow."

Is Sam correct? You must show your working and give a reason for your answer.

We Do

There are only green, white, and black counters in a bag.

The ratio of green to white counters is 2:3.

The ratio of white to black counters is 3:5.

Emma says, "Exactly half of the counters in the bag are black."

Is Emma correct? You must show your working and give a reason for your answer.

You Do

There are only pink, purple, and orange counters in a bag.

The ratio of pink to purple counters is 1:4.

The ratio of purple to orange counters is 2:3.

Tom says, "More than half of the counters in the bag are orange."

Is Tom correct? You must show your working and give a reason for your answer.

Challenge

In a box of chocolates, there are only milk, dark, and white chocolates.

The ratio of milk to dark chocolates is 2:3.

The ratio of dark to white chocolates is 4:1.

Sarah says, "Less than 15% of the chocolates in the box are white."

Is Sarah correct? You must show your working and give a reason for your answer.

Answers & Worked Solutions

- **I Do:**

Find a common ratio for Blue. $R:B = 3:4$. $B:Y = 2:5 = 4:10$.

Combined ratio $R:B:Y = 3:4:10$.

Total parts = $3 + 4 + 10 = 17$ parts.

Yellow fraction = $10/17$.

Half of the counters would be $8.5/17$. Since $10/17 \neq 1/2$ (or $8.5/17$), Sam is wrong.

Answer: No, Sam is incorrect.

- **We Do:**

Find a common ratio for White. $G:W = 2:3$. $W:B = 3:5$.

Combined ratio $G:W:B = 2:3:5$.

Total parts = $2 + 3 + 5 = 10$ parts.

Black fraction = $5/10$.

$5/10$ simplifies exactly to $1/2$.

Answer: Yes, Emma is correct.

- **You Do:**

Find a common ratio for Purple. $P:Pu = 1:4$. $Pu:O = 2:3 = 4:6$.

Combined ratio $P:Pu:O = 1:4:6$.

Total parts = $1 + 4 + 6 = 11$ parts.

Orange fraction = $6/11$.

Half of the counters would be $5.5/11$. Since $6/11 > 5.5/11$, it is more than half.

Answer: Yes, Tom is correct.

- **Challenge:**

Find a common ratio for Dark. $M:D = 2:3 = 8:12$. $D:W = 4:1 = 12:3$.

Combined ratio $M:D:W = 8:12:3$.

Total parts = $8 + 12 + 3 = 23$ parts.

White fraction = $3/23$.

15% as a fraction is $15/100 = 3/20$.

Compare $3/23$ and $3/20$. Since the numerators are the same, the fraction with the larger denominator is smaller. Therefore, $3/23 < 3/20$.

Answer: Yes, Sarah is correct.