What Is a Ratio?

Understanding ratios: Mistakes and missing information

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QUICK REVIEW

A ratio compares counts in a stated order. For 4 blue and 6 gold beads, blue to gold is $4 : 6 = 2 : 3$, but blue to all is $4 : 10 = 2 : 5$. For every 2 blue, there are 3 gold preserves the same order.

Worked example

There are 6 apples and 9 pears. State apples to pears and apples to all.

1. $6 \div 3 = 2$ and $9 \div 3 = 3$, so apples to pears is $2 : 3$.
2. Total fruit: $6 + 9 = 15$.
3. Apples to all is $6 : 15 = 2 : 5$ because $15 \div 3 = 5$.
Answer: $2 : 3$ and $2 : 5$.

Practice Problems

Show your thinking.

1. There are 9 cats and 6 dogs. Ari says cats to all pets is $3 : 2$. Correct this.

2. Red to blue is $4 : 7$. There are 21 blue beads. How many red beads?

3. Can $6 : 10$ be simplified to $3 : 7$ by subtracting 3? Correct the ratio.

4. A to B is $5 : 3$, and there are 32 objects. Find both counts.

5. Kai writes $8 : 12 = 2 : 12$. Explain and repair the unequal scaling.

6. Give two different collections with red to blue $3 : 4$ and at least 10 objects.

7. A to all is $2 : 7$. Find A to B, where B is everything that is not A.

8. A bag has 4 white and 6 black counters. One white is added. Does white to black stay $2 : 3$?

Answer Key

1. $3:5$.
2. 12.
3. $3:5$.
4. A: 20; B: 12.
5. $2:3$.
6. Examples: $(6,8)$ and $(9,12)$.
7. $2:5$.
8. No; it becomes $5:6$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. $9+6=15$ pets; $3:2$ compares cats to dogs.
2. Cats to all: $9:15=(9\div3):(15\div3)=3:5$.

Problem 2

1. $21\div7=3$ equal groups.
2. Red count $=4\times3=12$; check $12:21=4:7$.

Problem 3

1. $6/10=3/5$, but $3/7\neq3/5$.
2. Divide both terms by 2: $6:10=3:5$.

Problem 4

1. $5+3=8$ parts; $32\div8=4$ per part.
2. $5\times4=20$ and $3\times4=12$; $20+12=32$.

Problem 5

1. The first count was divided by 4: $8\div4=2$.
2. The second must also be divided by 4: $12\div4=3$.

Problem 6

1. Double: $(3\times2,4\times2)=(6,8)$, total 14.
2. Triple: $(3\times3,4\times3)=(9,12)$, total 21; both preserve $3:4$.

Problem 7

1. In 7 total parts, A uses 2, leaving $7-2=5$ for B.
2. A to B is $2:5$; $2+5=7$ checks the whole.

Problem 8

1. Originally $4/6=2/3$.
2. After adding one, $5/6-2/3=1/6$, so the ratio changed.

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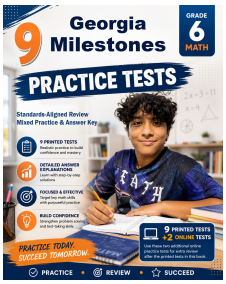

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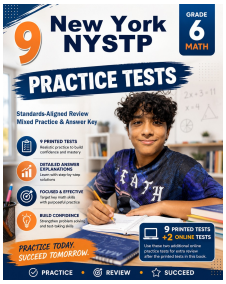

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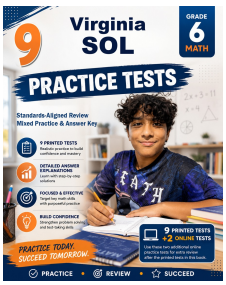

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