

Lesson 53

Course 2-Teacher Notes

Objective: TSW create ratio boxes and use proportions to solve ratio word problems.

In this lesson we will use proportions to solve ratio word problems. Consider the following ratio word problem:

The ratio of parrots to macaws at a bird sanctuary was 3 to 5. If there were 45 parrots, how many macaws were there?

In this problem there are two kinds of numbers, ratio numbers and actual count numbers. The ratio numbers are 3 and 5. The number 45 is an actual count of parrots. We will arrange these numbers into two columns and two rows to form a ratio box. It will be useful to learn how to utilize the ratio boxes for later lessons that are more complex.

| | Ratio | Actual Count |
|---------|-------|--------------|
| Parrots | 3 | 45 |
| Macaws | 5 | m |

We were not given the actual count of the macaws, so we have to use a variable (m) to stand for the number of macaws. The numbers in this ratio box can be used to write a proportion. By solving the proportion, we find the actual count of macaws.

| | Ratio | Actual Count |
|---------|-------|--------------|
| Parrots | 3 | 45 |
| Macaws | 5 | m |

$$\begin{aligned} &\longrightarrow \frac{3}{5} = \frac{45}{m} \\ &\longrightarrow 3m = 225 \\ &\qquad m = 75 \end{aligned}$$

We find that the actual count of macaws was 75.

Example 1.

In the auditorium the ratio of boys to girls was 5 to 4. If there were 200 girls in the auditorium, how many boys were there?

SOLUTION:

We begin by making a ratio box.

| | Ratio | Actual Count |
|-------|-------|--------------|
| Boys | 5 | B |
| Girls | 4 | 200 |

We use the numbers in the ratio box to write a proportion. Then we solve the proportion and answer the question.

| | Ratio | Actual Count |
|-------|-------|--------------|
| Boys | 5 | B |
| Girls | 4 | 200 |

$$\begin{aligned} &\longrightarrow \frac{5}{4} = \frac{B}{200} \\ &\longrightarrow 4B = 1000 \\ &\qquad B = 250 \end{aligned}$$

There were **250 boys** in the auditorium.

Example 2.

The girl-boy ratio was 9 to 7. If 63 girls attended, how many boys attended?

SOLUTION:

| | Ratio | Actual Count |
|------|-------|--------------|
| Boy | 7 | b |
| Girl | 9 | 63 |

$$\frac{7}{9} = \frac{b}{63} = \text{Boys} = 49$$

Example 3.

The ratio of sparrows to bluejays at the bird sanctuary was 5 to 3. If there were 15 bluejays in the sanctuary, how many sparrows were there?

SOLUTION:

| | Ratio | Actual Count |
|----------|-------|--------------|
| Sparrow | 5 | x |
| Bluejays | 3 | 15 |

$$\frac{5}{3} = \frac{x}{15} = x = 25 \text{ sparrow S}$$

You Try!!!

The ratio of tagged fish to untagged fish was 2 to 9. Ninety fish tagged. How many fish were untagged?

SOLUTION:

| | Ratio | Actual Count |
|----------|-------|--------------|
| Tagged | 2 | 90 |
| Untagged | 9 | x |

$$\frac{2}{9} = \frac{90}{x} \quad 2x = 810 = x = 405 \text{ Untagged}$$

CW: 15, 21, 27, 6, 7, 8, 9, 14, 20, *22, 23, 25

HW: 1-5, 10-14, 16-19, 22-26, 28-30