Teacher Notes.

Lesson 5: Solving Problems by Finding Equivalent Ratios

Classwork

Example 1

A County Superintendent of Highways is interested in the numbers of different types of vehicles that regularly travel within his county. In the month of August, a total of 192 registrations were purchased for passenger cars and pickup trucks at the local Department of Motor Vehicles (DMV). The DMV reported that in the month of August, for every 5 passenger cars registered, there were 7 pickup trucks registered. How many of each type of vehicle were registered in the county in the month of August?

a. Using the information in the problem, write four different ratios and describe the meaning of each.

The ratio of cars to trucks is 5:7

The ratio of trucks to cars is 7:5

The ratio of cars to total vehicles is 5:12

The ratio of trucks to total vehicles is 7:12

b. Make a tape diagram that represents the quantities in the part-to-part ratios that you wrote.

5:7

Cars:

trucks

c. How many equal-sized parts does the tape diagram consist of?

12

d. What total quantity does the tape diagram represent?

192

e. What value does each individual part of the tape diagram represent?

$\frac{192}{12} = 16$ $\frac{\text{total quantity}}{\text{12 vehicles (cars \& trucks)}}$

f. How many of each type of vehicle were registered in August?

5:7
initial ratio

$5 \cdot 16 = 80$ There were 80 passenger cars registered in August.

$7 \cdot 16 = 112$ There were 112 pickup trucks registered in August.

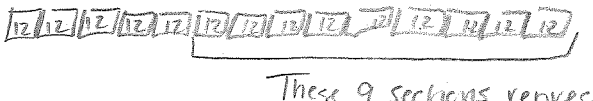
$80 + 112 = 192$

Example 2

The Superintendent of Highways is further interested in the numbers of commercial vehicles that frequently use the county's highways. He obtains information from the Department of Motor Vehicles for the month of September and finds that for every 14 non-commercial vehicles, there were 5 commercial vehicles. If there were 108 more non-commercial vehicles than commercial vehicles, how many of each type of vehicle frequently use the county's highways during the month of September?

14:5 = 108

Non-commercial vehicles



These 9 sections represent "more than commercial vehicles," = 108.

$\frac{108}{9} = 12$

Commercial vehicles

$12 \cdot 5 = 60$

148 Non-commercial vehicles
60 Commercial vehicles.

Tape Diagrams Help

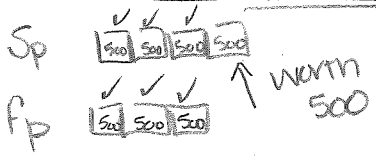
Exercises

1. The ratio of the number of people who own a smartphone to the number of people who own a flip phone is 4: 3. If 500 more people own a smartphone than a flip phone, how many people own each type of phone?

4:3

$4 \times 500 = 2{,}000$

$3 \times 500 = 1{,}500$



If one unit is 500 — all the units are 500.

2,000 people own a smart phone & 1500 people own a flip phone.

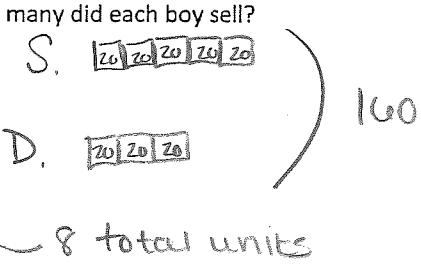
2. Sammy and David were selling water bottles to raise money for new football uniforms. Sammy sold 5 water bottles for every 3 water bottles David sold. Together they sold 160 water bottles. How many did each boy sell?

5:3 = 160

$\frac{160}{8} = 20$

S: $5 \times 20 = 100$

D: $3 \times 20 = 60$



Sammy sold 100 water bottles, & David sold 60 water bottles.

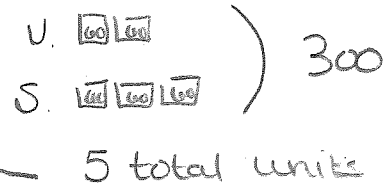
3. Ms. Johnson and Ms. Siple were folding report cards to send home to parents. The ratio of the number of report cards Ms. Johnson folded to the number of report cards Ms. Siple folded is 2: 3. At the end of the day, Ms. Johnson and Ms. Siple folded a total of 300 report cards. How many did each person fold?

2:3 = 300

$\frac{300}{5} = 60$

Ms. J. $2 \cdot 60 = 120$

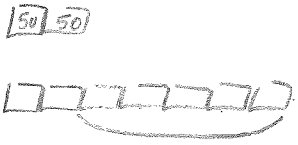
Ms. S. $3 \cdot 60 = 180$

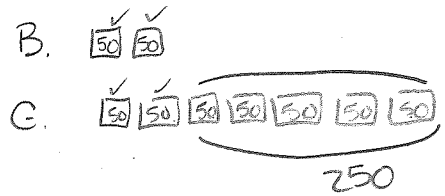


Ms. Johnson folded 120 report cards, & Ms. Siple folded 180 report cards.

4. At a country concert, the ratio of the number of boys to the number of girls is 2: 7. If there are 250 more girls than boys, how many boys are at the concert?

2:7





$\frac{250}{5} = 50$

$2 \cdot 50 = 100$ boys

There are 100 boys at the concert.