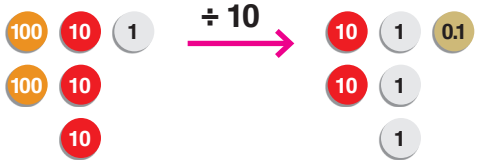
Think

(a) 231 kg of flour is divided equally into 10 containers. How many kilograms of flour are in each container?

(b) 231 kg of coffee is divided equally into 100 bags. How many kilograms of coffee are in each bag?

(c) 231 kg of cinnamon is divided equally into 1,000 bottles. How many kilograms of cinnamon are in each bottle?

Learn

(a) 

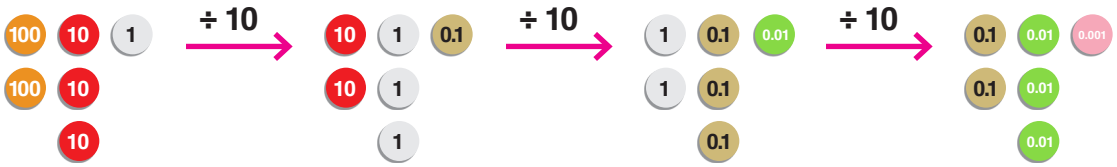
231 ÷ 10 = 23.1

There are _____ kg of flour in each container.

(b) 

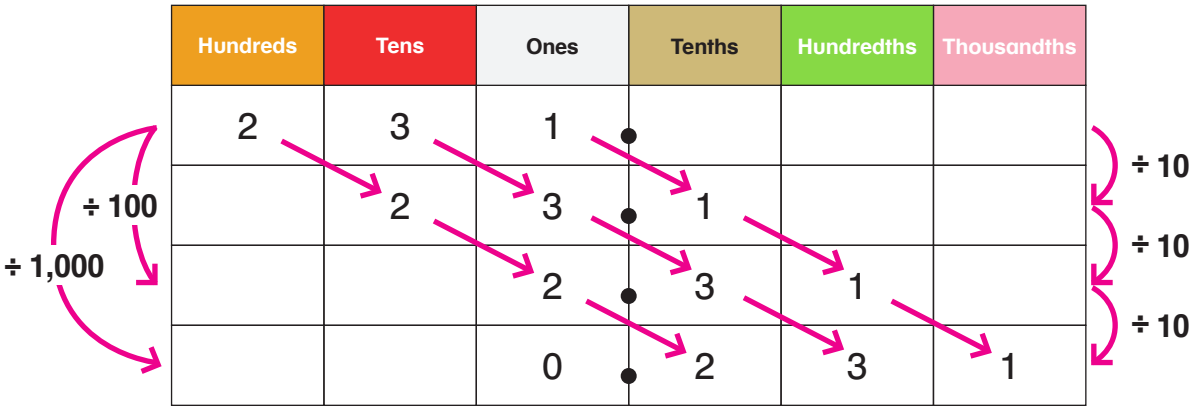
231 ÷ 10 ÷ 10 = 231 ÷ 100 = 2.31

There are _____ kg of coffee in each bag.

(c) 

$231 \div 10 \div 10 \div 10 = 231 \div 1{,}000 = 0.231$

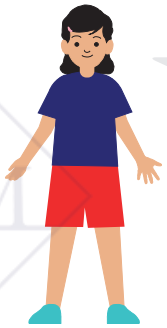
There are _____ kg of cinnamon in each bottle.



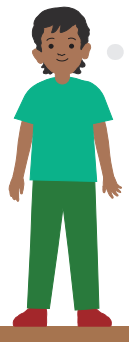
$231 \div 10 \rightarrow 2\ 3\ 1. \rightarrow 23.1$

$231 \div 100 \rightarrow 2\ 3\ 1. \rightarrow 2.31$

$231 \div 1{,}000 \rightarrow 2\ 3\ 1. \rightarrow 0.231$



To divide a number by 10, 100, or 1,000, move the decimal point 1, 2, or 3 places to the left, respectively.



What is 2.31 ÷ 10?
What is 2,310 ÷ 1,000?

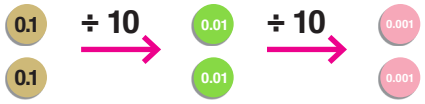
Do

1 (a) $2 \div 10 =$ ☐

(b) $0.2 \div 10 =$ ☐

(c) $0.02 \div 10 =$ ☐

(d) $0.2 \div 100 =$ ☐



(e) $2 \div 1{,}000 =$ ☐

2

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
	6	5			
		6	5		
		0	6	5	
		0	0	6	5

÷ 10
÷ 10
÷ 10

(a) $65 \div 10 =$ ☐

(b) $65 \div 100 =$ ☐

(c) $65 \div 1{,}000 =$ ☐

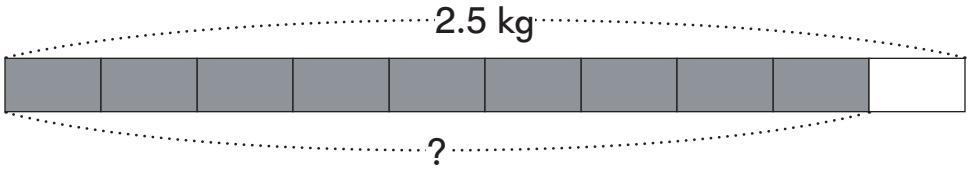
(d) $6.5 \div 10 =$ ☐

(e) $6.5 \div 100 =$ ☐

(f) $0.65 \div 10 =$ ☐

Think

1 meter of pipe weighs 2.5 kg. How much does 0.9 meters of pipe weigh?



Learn

Method 1

$$2.5 \times 0.9 = \frac{25}{10} \times \frac{9}{10}$$

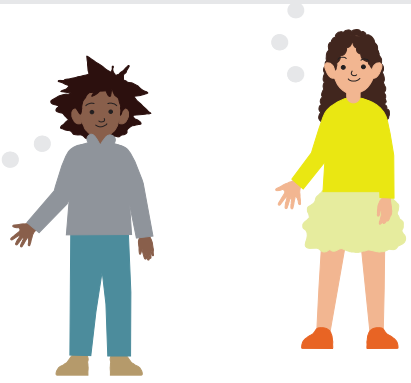
$$= \frac{25 \times 9}{100}$$

$$= \frac{225}{100}$$

$$= 2.25$$

2.5 = 25 tenths
25 tenths × 9 tenths
= (25 × 9) hundredths

2.5 × 0.9 ≈ 3 × 1 so the answer should be between 2 and 3.



Method 2

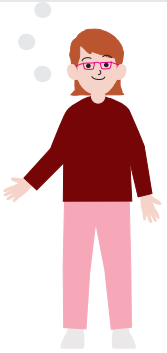
$$2.5 \times 0.9 = (25 \times 0.1) \times (9 \times 0.1)$$

$$= (25 \times 9) \times (0.1 \times 0.1)$$

$$= 225 \times 0.01$$

$$= 2.25$$

2.5 × 0.9 = (25 × 9) × 0.01

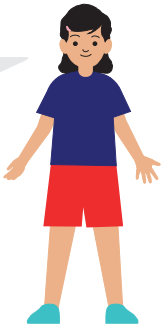


Method 3

25 × 9 is 100 times as much as 2.5 × 0.9.

$$\begin{array}{r} 2.5 \\ \times\ 0.9 \\ \hline 2.25 \end{array} \xrightarrow{\times 10,\ \times 10,\ \times 100} \begin{array}{r} 25 \\ \times\ 9 \\ \hline 225 \end{array}$$

÷ 100



$$\begin{array}{r} 2.5 \\ \times\ 0.9 \\ \hline 2.25 \end{array}$$

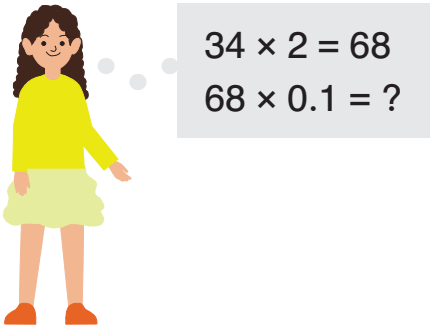
0.9 m of pipe weighs _____ kg.

Multiply decimals the same way as whole numbers. Place a decimal point in the product according to the number of decimal places being multiplied.

$$\begin{array}{rl} 2.5 & \leftarrow \text{1 decimal place} \\ \times\ 0.9 & \leftarrow \text{1 decimal place} \\ \hline 2.25 & \leftarrow \text{2 decimal places} \end{array}$$

Do

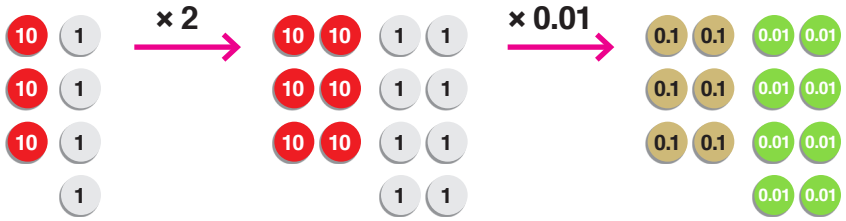
1 (a) Multiply 34 by 0.2.

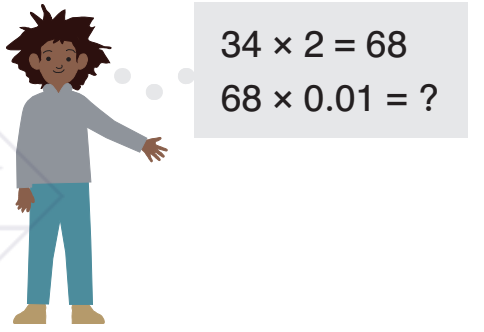


34 × 2 = 68
68 × 0.1 = ?

34 × 0.2 = ☐

(b) Multiply 34 by 0.02.

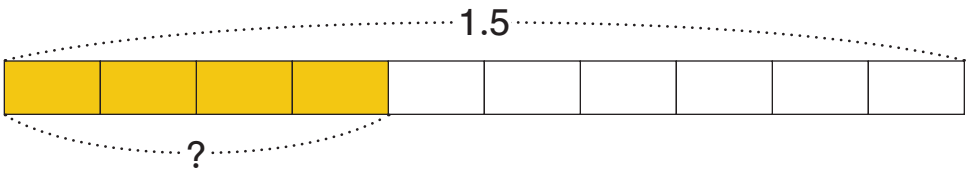




34 × 2 = 68
68 × 0.01 = ?

34 × 0.02 = ☐

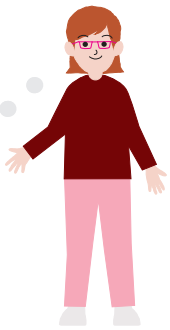
2 (a) Multiply 1.5 by 0.4.



$1.5 \times 0.4 = \frac{\square}{10} \times \frac{\square}{10}$

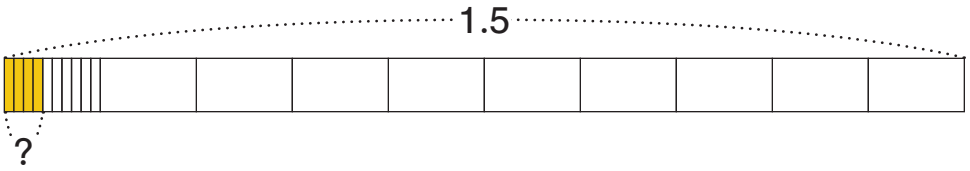
$= \frac{\square}{100}$

$= \square.\square$



1.5 = 15 tenths
15 tenths × 4 tenths
= (15 × 4) hundredths

(b) Multiply 1.5 by 0.04.

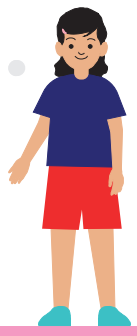


$1.5 \times 0.04 = \frac{\square}{10} \times \frac{\square}{100}$

$= \frac{\square}{1{,}000}$

$= \square.\square\square$

1.5 = 15 tenths
15 tenths × 4 hundredths
= (15 × 4) thousandths



5 Jessica saved 3 times as much money as David.

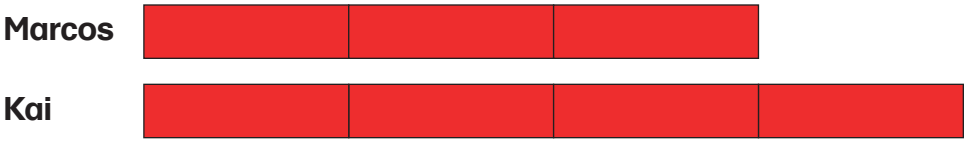
How many units of money does each person have?

(a) What is the ratio of Jessica's savings to David's savings?

(b) What is the ratio of David's savings to Jessica's savings?

(c) What is the ratio of David's savings to the total savings?

6 Marcos has $\frac{3}{4}$ as many marbles as Kai.



How many units of marbles does each person have?

(a) What is the ratio of Marcos's marbles to Kai's marbles?

(b) What is the ratio of Kai's marbles to Marcos's marbles?

(c) What is the ratio of Kai's marbles to the total marbles?

Exercise 1 • page 133

Think

Mei is making the Lemon Tea.

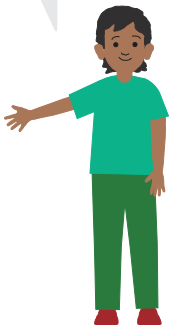
Lemon Tea

–Lemonade
–Unsweetened iced tea

Mix 4 cups of lemonade with 6 cups of unsweetened iced tea. Pour over crushed ice and serve.

Makes 10 one-cup servings.

What will be the ratio of cups of lemonade to cups of iced tea for each mixture?

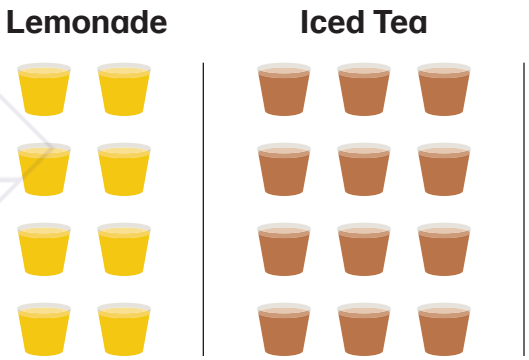


(a) How can she make 20 servings of this recipe?

(b) How can she make 5 servings of this recipe?

Learn

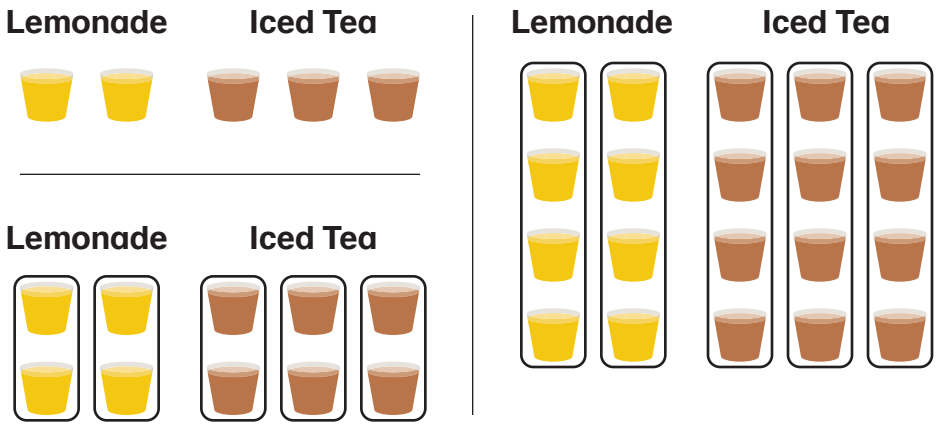
(a) To make 20 servings she needs to double the amount of each ingredient. The ratio of lemonade to iced tea will be 8 : 12.



$$4 : 6$$
$$\times 2 \downarrow \quad \downarrow \times 2$$
$$= 8 : 12$$

(b) To make 5 servings she needs to halve the amount of each ingredient. The ratio of lemonade to iced tea will be 2 : 3.

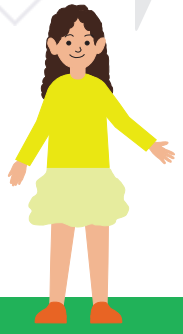
2 : 3, 4 : 6, and 8 : 12 are **equivalent ratios**.



In each ratio there are 2 units of lemonade for every 3 units of iced tea.

To make equivalent ratios, multiply or divide both terms by the same number. The simplest form of the ratios 8 : 12 and 4 : 6 is 2 : 3.

A ratio is in its simplest form when each term has no common factor other than 1.

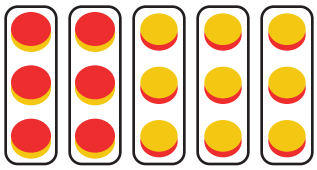


Do

1 Use 6 red and 9 yellow counters.

(a) What is the ratio of the total number of red counters to the total number of yellow counters?

(b) Make groups of 3. Each group should have the same color counters.



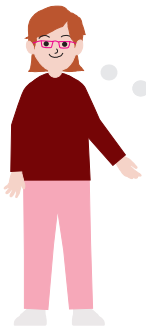
6 : 9
÷ 3 ↓ ↓ ÷ 3
= ? : ?

What is the ratio of groups of red counters to groups of yellow counters?

(c) What is the simplest form of the ratio 6 : 9?

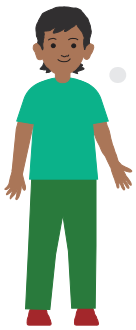
2 Find the equivalent ratios.

(a) 3 : 4 = 12 : ☐



3 : 4
× 4 ↓ ↓ × 4
= 12 : ?

(b) 12 : 16 = ☐ : 8

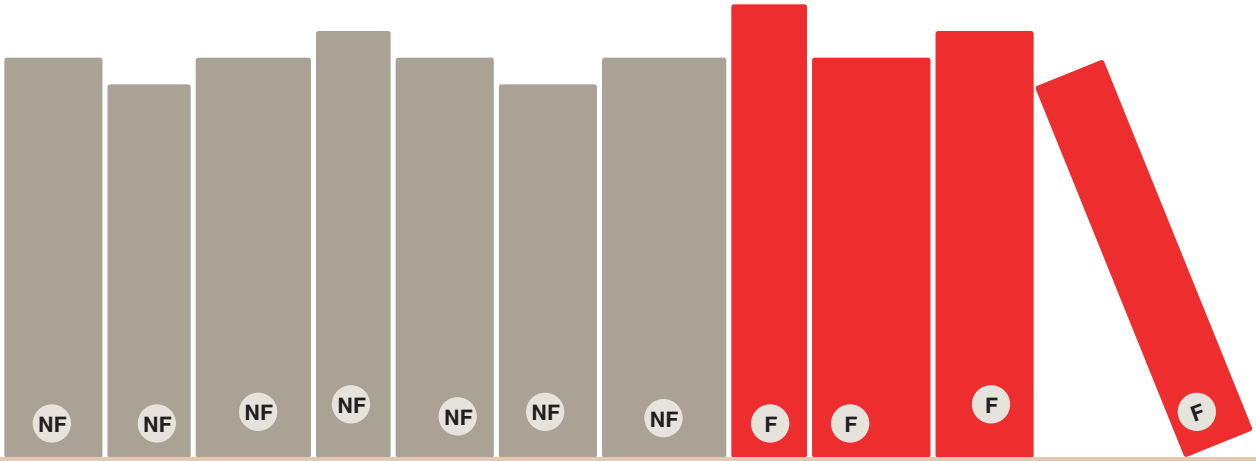


12 : 16
÷ 2 ↓ ↓ ÷ 2
= ? : 8

Lesson 5
Word Problems

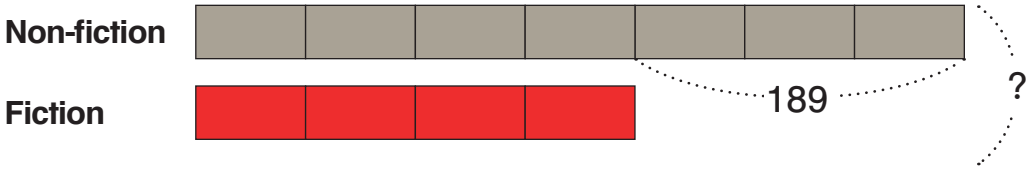
5

Think



A bookstore sells fiction books and non-fiction books. The ratio of non-fiction books to fiction books is 7 : 4. There are 189 more non-fiction books than fiction books. How many books are there altogether?

Learn



3 units ⟶ 189

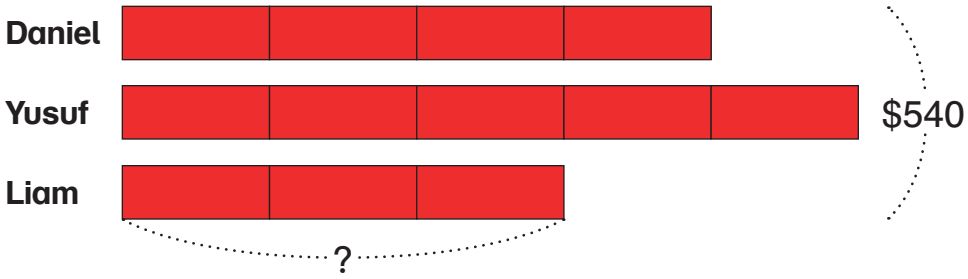
1 unit ⟶ 189 ÷ 3 = 63

11 units ⟶ 11 × 63 = 693

There are _____ books altogether.

Do

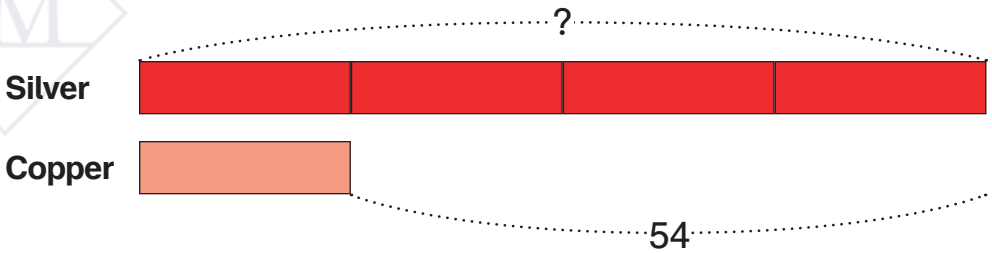
1 The ratio of Daniel's to Yusuf's to Liam's savings is 4 : 5 : 3. Their total savings is $540. How much money did Liam save?

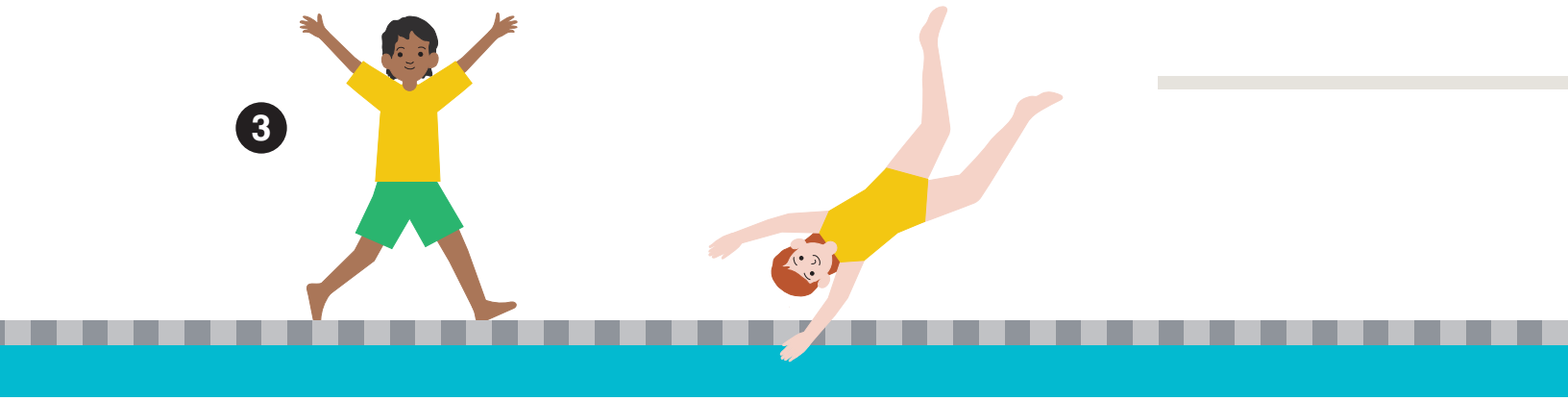


12 units ⟶ $540
1 unit ⟶ ?
3 units ⟶ ?

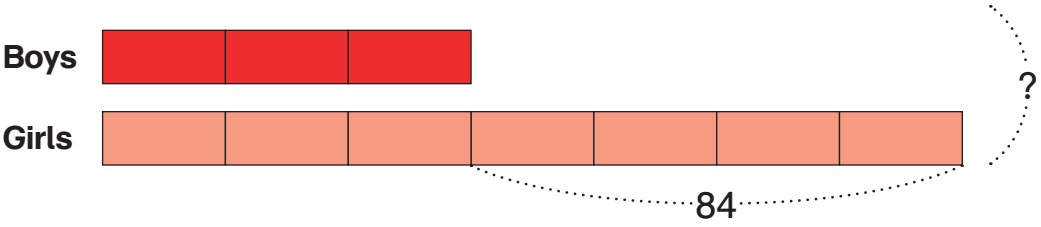
2

The ratio of silver-colored coins to copper-colored coins in Esther's coin collection is 4 : 1. There are 54 fewer copper-colored coins than silver-colored coins. How many silver-colored coins are in her collection?

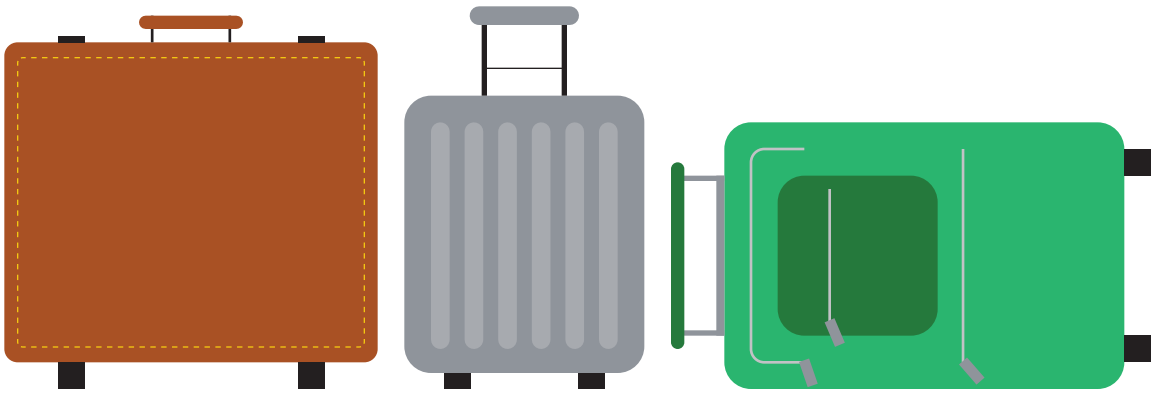




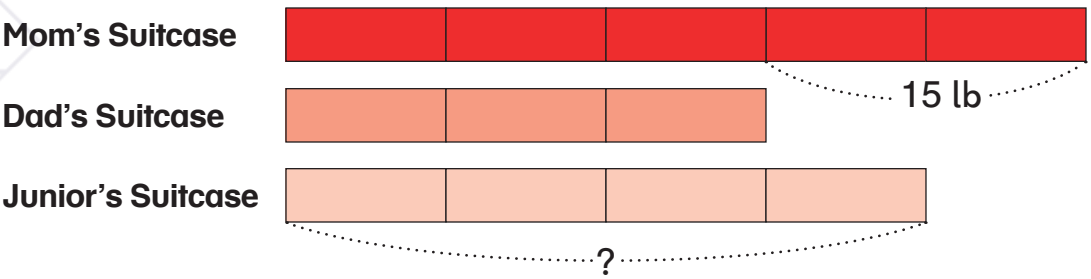
3 The ratio of boys to girls in a swim club is 3 : 7. There are 84 more girls than boys. How many children are in the swim club?



4



The ratio of the weights of Mom's packed suitcase to Dad's packed suitcase to Junior's packed suitcase is 5 : 3 : 4. Mom's suitcase weighs 15 lb more than Dad's suitcase. How much does Junior's suitcase weigh?

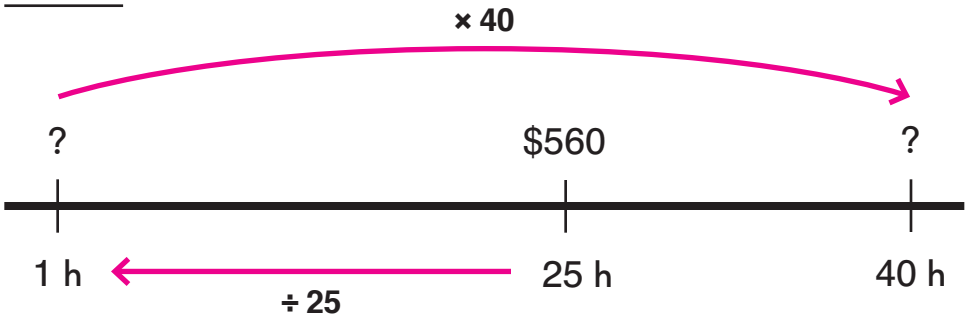


Think

Jessica worked for 25 hours one week and was paid $560. At this rate, how much would she earn for working 40 hours?

What is her hourly rate of pay?

Learn



25 h ⟶ $560

1 h ⟶ $\frac{560}{25}$ = $22.40

40 h ⟶ 40 × 22.40 = $896

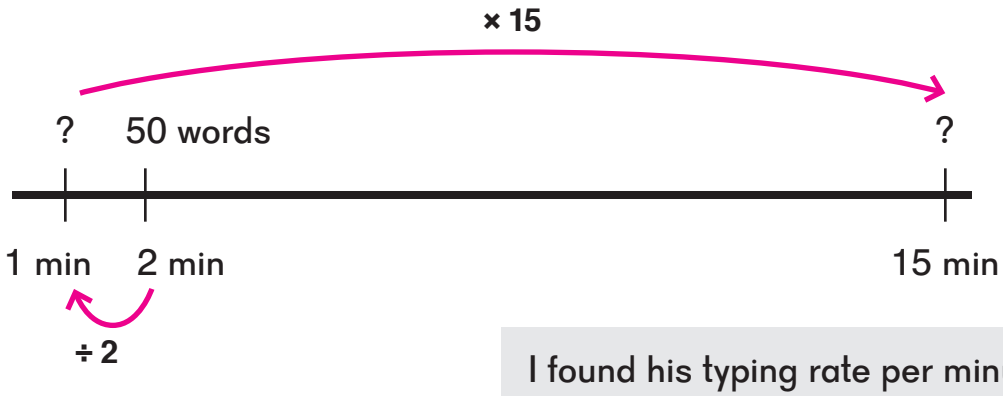
I found the amount for 40 hours this way:

$$40 \text{ h} \longrightarrow \overset{8}{\cancel{40}} \times \frac{560}{\cancel{25}_{5}} = 8 \times \frac{\overset{112}{\cancel{560}}}{\cancel{5}_{1}} = 896$$

She would earn $_____.

Do

1 Dion can type 50 words in 2 minutes. At this rate, how many words can he type in 15 minutes?



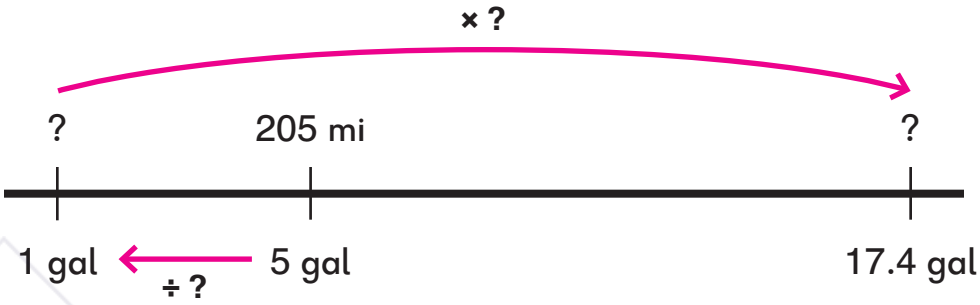
I found his typing rate per minute first.

2 min ⟶ 50 words

1 min ⟶ 50 ÷ 2 = ☐ words

15 min ⟶ 15 × ☐ = ☐ words

2 Mrs. Chen's hybrid car uses 5 gallons of gas to travel 205 miles. The capacity of the gas tank in her car is 17.4 gallons. How far can she travel on a full tank of gas?



5 gal ⟶ 205 mi

1 gal ⟶ 205 ÷ 5 = ☐ mi

17.4 gal ⟶ 17.4 × ☐ = ☐ mi