

Rates and Ratios

Extended Questions

Name : _____

1

Three friends shared the cost of a \$20 lottery ticket. The first gave \$5, the second \$7 and the third \$8. They were lucky and won a sum of \$7500.

How much should the second person receive if the prize is shared proportionally to the cost of the ticket paid by each?

Show your work.

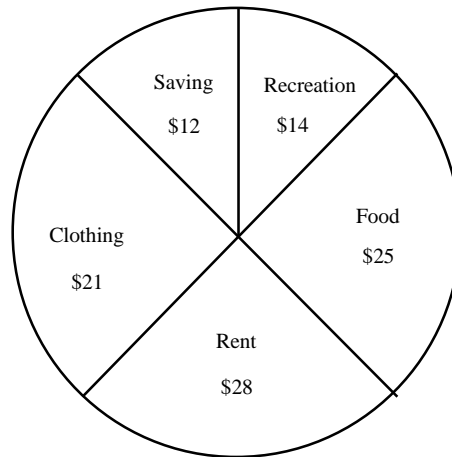
2

Every spring, geese head north for several months. If there are on average 3 blue geese in a population of 500, how many blue geese should there be in a population of 10 000?

Show your work.

3

The following circle graph shows how each \$100 of a family budget is divided up.



How much is spent on clothing if the family budget is \$23 000?

Show your work.

4

The traffic department wants to figure out the number of vehicles travelling on St. Isidor Blvd each week. A counter is set up. After 12 hours, 510 vehicles had passed on the boulevard.

At this rate what would the counter show after a week?

Show your work.

5

In a photograph, Cathy measures 3.2 cm and Jeffrey measures 3.8 cm. What is Cathy's actual height, in metres, if Jeffrey's actual height is 1.9 m?

Show your work.

6

It took 10 students 45 minutes to clean up the hall after the Disco Night dance.

At this rate, how long would it have taken 15 students?

Show your work.

7

Frank, Annie and Catherine won the three cash prizes in a raffle.

The ratio of Frank's winnings to Annie's winnings is 4 : 5.

The ratio of Frank's winnings to Catherine's winnings is 4 : 2.

Annie won \$3000.

What was the total amount of money won during this raffle?

Show all your work.

8

The quantities of juice contained in two bottles are in a ratio of 5 : 7. The larger bottle contains 350 mL of juice.

How many millilitres of juice are in the smaller bottle?

Show all your work.

9

Anita, Bruno and Carol have invested their savings in a window-washing company.

- The amounts invested by Anita and Bruno are in a ratio of 5 : 2.
- The amounts invested by Anita and Carol are in a ratio of 4 : 3.

Given that Carol invested \$600, what is the *total amount* invested by these three persons?

Show all your work.

10

Rafik, Robert, and Jason are playing Scrabble. After each had finished his first turn, they compared their scores.

Rafik's and Robert's scores were in a ratio of 4 : 3

Rafik's and Jason's scores were in a ratio of 8 : 5.

Robert got 36 points in his first turn.

How many points did the three players score in total after each one had finished his first turn?

Show all your work.

11

Sara, Terry and Mark used all the money in the student council budget to buy various items for a school raffle.

Sara spent 4 times as much money as Terry did.

The ratio of Sara's spending to Mark's spending was 2 : 5.

Terry spent \$85.

How much money was in the student council budget?

Show all your work.

12

The perimeter of a rectangle is 200 m. Find the dimension of this rectangle given that they are in the ratio of 2 to 3.

Show your work.

2- Correction key

1

Work : (example)

Fraction of the ticket cost paid by the second person

$$\frac{7}{20}$$

Second person's share of the prize

$$\frac{7}{20} \times 7500 = 2625$$

Result The second person should receive \$2625.

2

Work : (example)

$$\frac{3}{500} = \frac{x}{10\,000}$$

$$x = \frac{3 \times 10\,000}{500} = 60$$

Result 60 blue geese

3

Work : (example)

$$\frac{21}{100} = \frac{x}{23\,000}$$

$$x = \frac{12 \times 23\,000}{100}$$

Result \$4830 is spent on clothing.

4

Work : (example)

$$1 \text{ week} : 7 \text{ days} \times \frac{24 \text{ hours}}{\text{day}} = 168 \text{ hours}$$

Proportion :

$$\frac{510}{x} = \frac{12}{168}$$

$$x = \frac{510 \times 168}{12}$$

$$x = 7140$$

Result After one week, the counter would show 7140 vehicles had passed.

5

Work : (example)

$$\frac{\text{Cathy's height}}{\text{Jeffrey's height}} = \frac{x}{1.90 \text{ m}} = \frac{3.2}{3.8}$$

$$\text{Cathy's height} = \frac{3.2 \times 1.9 \text{ m}}{3.8} = 1.6 \text{ m}$$

Result Cathy is 1.6 m tall.

6

Work : (example)

10 students → 45 minutes

15 students → x minutes

(inverse proportion)

$$\frac{15}{10} = \frac{45}{x}$$

$$15x = 450$$

$$x = 30$$

Result 30 minutes

7

Example of an appropriate procedure

- The student used the right proportions and correctly determined each person's winnings.
- He or she added up these winnings.

Answer The total amount of money won during this raffle was \$6600.

8

Example of an appropriate method

$$\frac{5}{7} = \frac{x}{350}$$

$$x = \frac{5 \times 350}{7}$$

$$x = 250$$

Answer The smaller bottle contains 250 mL of juice.

9

Example of an appropriate method

Anita's investment

$$\frac{\text{Anita}}{\text{Carol}} : \frac{4}{3} = \frac{x}{600}$$

$$x = \frac{600 \times 4}{3}$$

$$x = 800$$

Bruno's investment

$$\frac{\text{Anita}}{\text{Bruno}} : \frac{5}{2} = \frac{800}{x}$$

$$x = \frac{800 \times 2}{5}$$

$$x = 320$$

The total amount invested by these three people

$$600 + 800 + 320 = 1720$$

Answer The total amount invested by these three people is \$1720.

Example of an appropriate solution

10

Number of points scored by Rafik

$$\frac{\text{Number of points scored by Rafik}}{\text{Number of points scored by Robert}} = \frac{r}{36} = \frac{4}{3}$$

$$r = \frac{4 \times 36}{3} = 48$$

Number of points scored by Jason

$$\frac{\text{Number of points scored by Rafik}}{\text{Number of points scored by Jason}} = \frac{48}{l} = \frac{8}{5}$$

$$l = \frac{5 \times 48}{8} = 30$$

Total number of points

$$36 + 48 + 30 = 114$$

Answer In total, the three players scored 114 points after each had his first turn.

11

Sara's expenses

$$4 \times 85 = 340$$

Mark's expenses

$$\frac{\text{Sara's expenses}}{\text{Mark's expenses}} = \frac{340}{x} = \frac{2}{5}$$

$$x = \frac{5 \times 340}{2} = 850$$

Terry's expenses

$$85$$

Total expenses

$$340 + 850 + 85 = 1275$$

Answer: There was \$1275 in the student council budget.

Note: Students who determined the cost of the doughnuts at one of the two stores have shown that they have a partial understanding of the problem.

12

Half the perimeter

$$200 \div 2 = 100$$

Width of rectangle

$$\frac{2}{5} \times 100 = 40$$

Length of rectangle

$$\frac{3}{5} \times 100 = 60$$

Result The dimensions are 40 m by 60 m.