

<b>Student Name:</b> _____	<b>Grade:</b> _____
<b>Date:</b> _____	<b>Score:</b> _____

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## 8 Year 8 Term 3 Week 8 Homework

### 8.1 Equations

#### 8.1.1 Number problems

##### Exercise 8.1.1

1. Linda is four times as old as Alice. In 12 year's time, Linda will only be twice as old as Alice. Find their present ages.

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2. Peter is 47 years old and his son Ruth is 16 years old. In how many years' time will Peter be twice as old as his son?

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3. If  $\frac{x}{5} - 5 = 3$ , what is the value of  $\frac{x}{4} + 4$ ?

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4. Eighteen more than the second of three consecutive even integers is the same as the difference between the third and eight times the first. Find the numbers.

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5. One number is four more than another. The sum of the larger number and twice the smaller number is 19. Find the numbers.

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6. The greater of two numbers is 10 less than seven times the smaller number. Their sum is 30. find the numbers.

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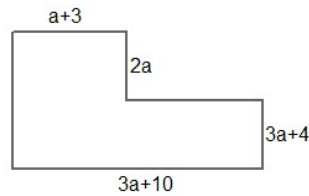
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**8.1.2 Geometry problems**

**Exercise 8.1.2 Form an equation using the given measurements. Solve the equation to find the value of the pronumerals.**

1. *If the perimeter of the given figure is equal to 60 cm , find the value of a, and then find the area of the given figure.*




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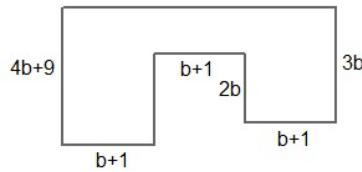


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2. *If the perimeter of the given figure is equal to 78 cm , find the value of b, and then find the area of the given figure.*




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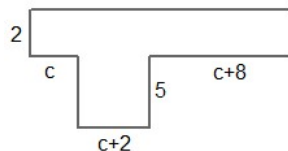


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3. *If the area of the given figure is equal to 85 cm<sup>2</sup> , find the value of c, and then find the perimeter of the given figure.*




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## 8.2 Ratio and Rate

### 8.2.1 The definition of ratio

A ratio is a comparison of two or more like quantities written in a specific order.

#### Exercise 8.2.1

1. In a pen jar there are 8 red pens and 9 blue pens. Two red pens and 4 blue pens do not write. Find the ratio of:

(a) red pens to the blue pens \_\_\_\_\_

(b) blue pens to the total number of pens \_\_\_\_\_

(c) faulty red pens to working pens \_\_\_\_\_

(d) working pens to faulty pens \_\_\_\_\_

2. Express these percentages as ratio:

(a)  $12\frac{1}{2}\%$  \_\_\_\_\_

(b) 58% \_\_\_\_\_

(c) 128% \_\_\_\_\_

(d)  $66\frac{2}{3}\%$  \_\_\_\_\_

3. Arrange these ratios in ascending order: 3:6, 4:9, 5:12, 6:15

\_\_\_\_\_

4. A sum of money was shared between Kevin, Cathy and Peter in such way that Kevin received  $\frac{3}{16}$  of the money and Cathy received twice as much as Kevin. In what ratio was the money divided?

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**8.2.2 Equivalent ratios**

Two ratios are equivalent if they have the same value when written as fractions.

- The ratio  $a:b$  and  $c:d$  are equivalent if  $\frac{a}{b} = \frac{c}{d}$
- If each term in the ratio  $a:b$  is multiplied by a constant  $k$ , then the ratio  $a:b$  and  $ak:bk$  are equivalent.

**Example 8.2.1** Find the value of the pronumeral in each of these equivalent ratios:

1.  $7:9 = 28:m$

**Solution:**  $7 \times m = 9 \times 28, \quad \therefore m = \frac{9 \times 28}{7} = 36$

2.  $\frac{p}{6} = \frac{3}{8}$

**Solution:**  $8 \times p = 6 \times 3, \quad \therefore p = 2.25$

**Exercise 8.2.2** Find the value of the pronumerals

1.  $2 : 5 = x : 25$  \_\_\_\_\_

2.  $21 : x = 3 : 5$  \_\_\_\_\_

3.  $5 : 8 = 40 : x$  \_\_\_\_\_

4.  $\frac{x}{3} = \frac{3}{2}$  \_\_\_\_\_

5.  $\frac{2}{5} = \frac{x}{8}$  \_\_\_\_\_

6.  $\frac{y}{6} = \frac{5}{4}$  \_\_\_\_\_

**Exercise 8.2.3** Further applications

1. Two numbers are in the ratio  $4 : 9$ . If the larger number is 108, find the difference between the numbers.

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2. The ratio of chickens to geese on a farm is  $3:5$ , while the ratio of geese to ducks is  $2:3$ . What is the ratio of chickens to ducks?

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\_\_\_\_\_

**8.2.3 Simplifying ratios**

To simplify a ratio:

- express each term in the same units first
- then divide all term by their highest common factor (HCF).

To simplify a ratio that contains fractions or decimals:

- express any decimals as fractions
- multiply each term by the LCM
- simplify where possible.

**Exercise 8.2.4 Simplify these ratios:**

1.  $49 : 21$  \_\_\_\_\_
2.  $30 : 42$  \_\_\_\_\_
3.  $70 : 63$  \_\_\_\_\_
4.  $132 : 144$  \_\_\_\_\_
5.  $174 : 126$  \_\_\_\_\_
6.  $8 : 6 : 12$  \_\_\_\_\_
7.  $42 : 56 : 28$  \_\_\_\_\_
8.  $36 : 48 : 60$  \_\_\_\_\_

**Exercise 8.2.5 Express each term of these ratios in the same units, then simplify:**

1.  $20 \text{ min} : 2 \text{ hours}$  \_\_\_\_\_
2.  $3.2 \text{ km} : 2400 \text{ m}$  \_\_\_\_\_
3.  $1.5 \text{ ha} : 9000 \text{ m}^2$  \_\_\_\_\_
4.  $1.5 \text{ days} : 72 \text{ hours}$  \_\_\_\_\_
5.  $150 \text{ cm} : 5 \text{ m}$  \_\_\_\_\_
6.  $2.2 \text{ kg} : 1600 \text{ g}$  \_\_\_\_\_

**Exercise 8.2.6 Simplify the following ratios:**

1.  $\frac{9}{17} : \frac{15}{17}$  \_\_\_\_\_

2.  $\frac{3}{5} : 7$  \_\_\_\_\_

3.  $1 : \frac{3}{7}$  \_\_\_\_\_

4.  $\frac{3}{7} : \frac{3}{5}$  \_\_\_\_\_

5.  $\frac{2}{5} : 1\frac{4}{5}$  \_\_\_\_\_

6.  $1\frac{3}{8} : 2\frac{3}{4}$  \_\_\_\_\_

**Exercise 8.2.7 Simplify the following ratios which contain decimals:**

1.  $0.3 : 0.7$  \_\_\_\_\_

2.  $0.08 : 0.24$  \_\_\_\_\_

3.  $0.32 : 0.8$  \_\_\_\_\_

4.  $1.5 : 1.25$  \_\_\_\_\_

5.  $0.8 : \frac{3}{5}$  \_\_\_\_\_

6.  $1\frac{2}{5} : 0.56$  \_\_\_\_\_

**Exercise 8.2.8**

1. George earns \$25 per hour for 40-hour week. His friend Raymond receives \$68,000 per year. Find the ratio of their annual incomes, in simplest form.

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2. A square has a sides of 24 cm and a rectangle has a length of 12 cm and a width 8 cm . Find the ratio of their areas.

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3. Bob is 25 years old and his father is 35 years older. Bob's grandfather is 95. In what ratio are their ages, from youngest to oldest?

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**8.2.4 Problem solving 1****Exercise 8.2.9**

1. A block of wood is 1 cubic metre. It is cut into small cubes of 1 cubic centimetre. If we stacked the small cubes above one another, what would be the total height?

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2. Fifty-eight more than the second of three consecutive even integers is the same as the difference the third and ten times the first. Find the numbers.

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3. The cost price of an article is \$1.75 and its selling price is \$4.20. Calculate the ratio of:

(a) the cost price to the selling price.

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(b) the profit to the cost price.

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4. For every 8 red marbles in a bag there are 5 blue marbles and for every 3 blue marbles there are 2 green marbles. If there are 30 green marbles, how many red marbles are there?

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5. The ratio of students studying French to those studying German is 4:7. The ratio of students studying German to those studying Japanese is 2:5. What is the ratio of students studying French to those studying Japanese?

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**8.2.5 Problem solving 2****Exercise 8.2.10**

1. John had \$91 and Bob had \$28. They each spent the same amount of money. The ratio of John's money to Bob's money then became 4:1. How much money did they spend altogether?

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2. Mum brought 40 apples and 26 oranges. After eating an equal number of apples and oranges, the ratio of the remaining apples to oranges became 2:1. How many apples had left over?

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3. Tom had 87 red marbles and 39 blue marbles. He gave away an equal number of red and blue marbles to his younger brother. The ratio of the remaining red marbles to the blue marbles then became 7:3.

(a) How many red marbles had he left?

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(b) How many marbles did he give away to his brother?

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4. Bonnie spent a total of \$360 on some \$2 stamps and some \$4 stamps. The ratio of \$2 stamps to \$4 stamps that she bought was 2:9. How much more did she spend on the \$4 stamps than on the \$2 stamps?

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### 8.3 Maths Challenge

#### Exercise 8.3.1

1. It is known that the sum of two positive integers is 45 and their LCM is 168, find the numbers.

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2. There is a sequence of nine numbers. The average of the first five numbers is 7, and the average of the last five numbers is 10. If the average of all nine numbers is 9, what is the fifth number?

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3. A group of students move some chairs from one room to another. If each student takes  $y$  chairs, there will be 12 chairs left. If each of them takes 8 chairs, the last student just needs to take 7 chairs. What is the number of this group of students?

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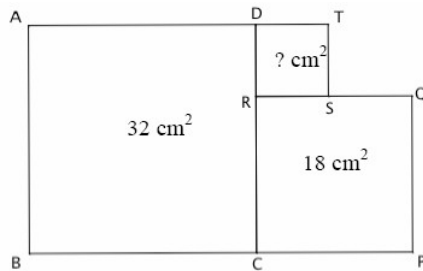


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4. In the figure shown below, areas of the squares  $ABCD$  and  $PQRC$  are  $32\text{ cm}^2$  and  $18\text{ cm}^2$  respectively. Find the area of the square  $RSTD$ .




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