Solve word problems using ratio

Solve the following problems:

1 In a garden the ratio of rose bushes to shrubs is 10 : 3. If there are 70 rose bushes in the garden, how many shrubs are there?

2 A recipe states that the ratio of flour to sugar is to be 5 kg to 2 kg. If I am using 15 kg of flour, how much sugar will I need?

3 The ratio of petrol to oil for my outboard motor is 50 : 1. How much oil is needed to be mixed with 75 litres of petrol?

4 During a season a bowler at cricket has a wicket to run ratio of 3 : 38. If in a game she takes 12 wickets, how many runs would you expect to have been scored from her bowling?

5 On TV the ratio of program time to time for advertisements is 7 : 3. During an evening there were 90 minutes of advertising. How many minutes of program time were there?

1 Share:

   a 60 kg in the ratio 1 : 4   **b** 80 m in the ratio 3 : 5

   c $2000 in the ratio 7 : 3   **d** 1800 tonnes in the ratio 5 : 1

2 A fortune of $24 000 is to be divided up in the ratio of 7 : 1. What is the larger share?

3 A cake is to be shared amongst three people in the ratio 1 : 3 : 5. If the cake weighs 900 g, what is the weight of the middle share?

4 **a** When a house was painted, the two painters split the work in the ratio 6 : 5. What fraction of the house was painted by each painter?

   b Four members of a household helped move a load of firewood in the ratio 1 : 3 : 4 : 7. What fraction of the total load did the best worker move?

5 The ratio of petrol to oil in one can is 3 : 1, and in another can the ratio is 7 : 2. If equal quantities of each can were poured into a third container, what would be the ratio of petrol to oil in this container?

6 One full container has a water and alcohol mix in the ratio 4 : 1. Another container of twice the capacity has a water and alcohol mix in the ratio 5 : 1. If the contents of both containers are mixed together what will be the ratio of water to alcohol?

EXERCISE 1I

Achievement Standard Questions

1. At 6 pm the ground temperature was 6^oC. It was expected to drop a further 9^oC by 6 am the next day. What would the ground temperature be at 6 am the next day?

2. A mini submarine was reported at $^-1050$ m. It rose up 250 m to observe a new variety of fish. What was its depth (expressed as an integer) when observing the fish?

3. Jan ate $\frac{1}{3}$ of her lunch while walking to school and another $\frac{1}{4}$ at interval. What fraction of her lunch did she have left to eat at lunchtime?

4. At the supermarket Heta bought 8 kg of potatoes at $3.50 per 4 kg, 5 bunches of carrots at $1.40 a bunch and 6 litres of milk at $1.70 per litre. How much did all this cost Heta?

5. In a group of 20 school students three had red hair. In the school there were 600 students. How many would you estimate had red hair?

6. The ratio of boys to girls at a school was 3 : 2. If there were 200 students in the school, how many boys would there be?

7. The answer to a problem, according to my calculator, was 3.27×10^4. What was the answer in ordinary form?

8. When adults are asked to complete a questionnaire only $\frac{4}{5}$ of them do so. If I sent out 60 questionnaires to adults how many would I expect to answer them?

Excellence and Merit Standard Questions

9. Janine noticed the following signs in a shop.

   "Jeans reduced from $35 to $24.00"

   "Tops were $18.50 now only $15.70"

   "Skirts now at a low price of $27, down from $32.50"

   a. If Janine purchased a pair of jeans, three tops and two skirts from the shop, how much money would she have saved in total?

   b. By what fraction were the jeans reduced?

   c. Another advertising brochure for the same sale said that the skirts were reduced by $\frac{1}{4}$ of the original price. Is this a correct statement? Show working to justify your answer.

10 Jim was fortunate to win $600 in a raffle. He decided to spend $\frac{1}{4}$ of it on a CD player. He then spent $\frac{1}{5}$ of the remaining money on CDs and $\frac{3}{4}$ of what he had left on clothing. He saved the rest.

   a What fraction of his money did he save?

   b How much did he spend on each of the items he purchased?

   c How much money did he save?

11 As a fundraiser the soccer club decided to sell cheese rolls. It cost them $2 for 10 breadrolls, $5 for cheese to fill 20 rolls and $1 for margarine for 100 rolls.

   a How much does it cost to make up one cheese roll?

   b If the cheese rolls are sold at $6 per 10 rolls, how much profit does the club make per roll?

   c What fraction of the cost price is this profit?

   d The club wishes to make $500 profit from selling cheese rolls. How many would they need to sell at $6 per 10 rolls to do this? Do you think this is reasonable? If you were in charge of the project what would you do to increase profits? Explain your answer and justify it with mathematical statements.

12 You are in charge of setting the ticket price to a disco your school is running to raise money for a new sound system in the hall. Here are some details to help you.

- The school roll is 850.
- The sound system you hope to buy costs $5000. You do not expect to raise all this from the concert.
- The options for music at the disco are a live band charging $500 for the night, a disc jockey who charges $450 for the night or students playing their own CDs charging nothing. The band and disc jockey provide their own lighting and equipment.
- The hall hire is $150 for the night, but you will get this reduced by half if over 200 students turn up.
- You will need some advertising around the school and have to find the cost for it.
- You will need some spot prizes for the evening to encourage students to attend.

Using this information, and any other not given here, calculate a reasonable price for each ticket and justify your answer by correct mathematical statements and reasoning.

Note: Further questions can be found in percentage chapter.

Check your answers

EXERCISE 1H.4

1 21 shrubs **2** 6 kg **3** 1.5 L **4** 152 runs
5 210 minutes

EXERCISE 1H.5

1 **a** 12 kg and 48 kg **b** 30 m and 50 m
c $1400 and $600 **d** 1500 tonnes and 300 tonnes
2 $21 000 **3** 300 g
4 **a** $\frac{6}{11}$ by one and $\frac{5}{11}$ by the other **b** $\frac{7}{15}$
5 55 : 17 **6** 37 : 8

Word problems

1 $^-3°C$ **2** $^-800$ m **3** $\frac{5}{12}$ **4** $24.20 **5** 90
6 120 **7** 32 700 **8** 48
9 **a** $30.40 **b** $\frac{11}{35}$

c $\frac{1}{4}$ of $32.50 is $8.12 but the actual reduction
was $5.50 so, the stated reduction was too big.

10 **a** $\frac{3}{20}$

b $150 on the CD player, $90 on CDs, $270 on clothing

c $90

11 **a** 46 cents **b** 14 cents per roll **c** $\frac{7}{23}$

d 3572. This is probably more than they expect to sell (depending on the size of the club). Costs probably cannot be reduced so increase the selling price.

12 Submit your complete answer to your teacher for marking. It should include total costs from band, advertising, prizes, etc. Estimate the number who might attend. Suggest a price per ticket including known costs and profit.