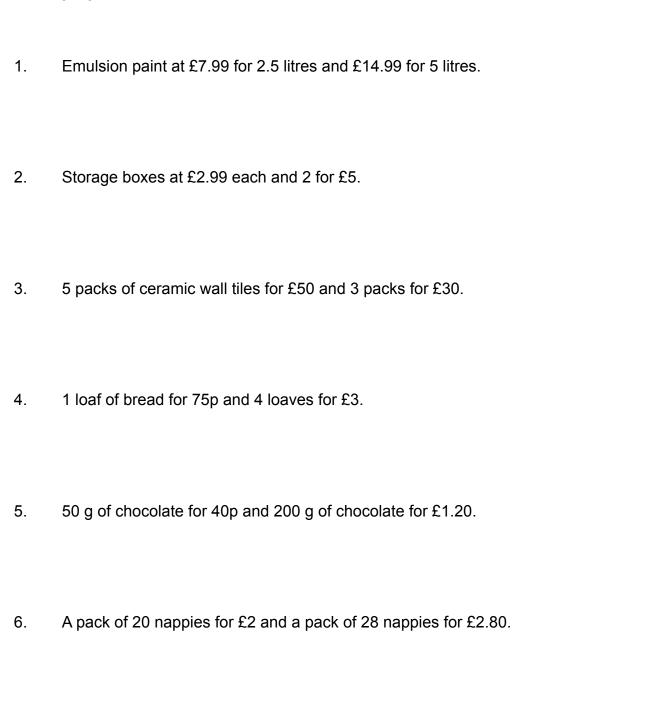# Skillswise

Identifying prices in direct proportion

Prices are not always directly proportional to the number of items. Which of the following are in **direct proportion**?

1.   Emulsion paint at £7.99 for 2.5 litres and £14.99 for 5 litres.

2.   Storage boxes at £2.99 each and 2 for £5.

3.   5 packs of ceramic wall tiles for £50 and 3 packs for £30.

4.   1 loaf of bread for 75p and 4 loaves for £3.

5.   50 g of chocolate for 40p and 200 g of chocolate for £1.20.

6.   A pack of 20 nappies for £2 and a pack of 28 nappies for £2.80.

Now check your answers with the answer sheet.

Skillswise

Sharing prize money 1

Example question: share a prize of £50 between Narinder and Habib in the ratio 2:3.

Number of shares needed (5)	2 + 3 = 5	+
1 share is (£10)	£50 ÷ 5 = £10	÷
2 shares are (£20)	2 × £10 = £20	×
3 shares are (£30)	3 × £10 = £30	×
5 shares are (£50)	£20 + £30 = £50	+

Check to see if the answer makes sense: £20 + £30 = £50 (yes!). So, Narinder's share is £20 and Habib's share is £30.

Now have a go at the questions below by solving these problems:

- find out how many shares are needed (+)
- find out the value of 1 share (÷)
- work out the amounts for the shares in the ratio (×)
- check to see if the answer makes sense (+)

1. £75 in the ratio 2:3

2. £60 in the ratio 4:5:1
(Tip: add all the shares in the same way.)

3. £28 in the ratio 4:3

4. £2,500 in the ratio 1:4

5. You've been given the heights of two candles: Candle A is 9 cm high; Candle B is 30 mm high. What is the ratio of their heights?
(Tip: make sure the things you're sharing are in the same units. There are 10 mm in 1 cm.)

Now check your answers with the answer sheet.

Sharing prize money 2

These questions are quite hard - you'll probably need to use a calculator.

1. Five people run a lottery syndicate together, hoping to win the jackpot. They've chosen to pay for a fixed amount of lines each week at £1 a line. They've agreed to divide any money they win in the same ratio as they've contributed to the syndicate. They've won £2,250,645. David pays for 5 lines, Marie for 3, Winston for 3 and Sheila and Steve for 2 lines each.

    How much will each person receive from their winnings?

2. Two car dealers have started a business. They expect it to be a success but have agreed to share all profits and losses equally, in the same ratio as they've invested their money to buy stock and premises.

    Dealer A has invested £180,000 and Dealer B has invested £120,000. How would they share:

    a. a profit of £70,000

    b. a loss of £8,000

    c. a profit of £306,000

    d. a profit of £144,620

    e. a loss of £18,080

3. A third dealer (Dealer C) had joined the partnership with the same agreement about sharing profits and losses. Dealer C had invested £300,000, how would they have shared the profits and losses above?

Now check your answers with the answer sheet.

Writing ratios as fractions

Ratios show how one number is related to another number.

When Craig explained about mixing paint, he talked about ratios and fractions. He explained that to create the first colour he mixed:

3 parts blue to 1 part white	4 parts (3 + 1)
$\frac{3}{4}$ blue to $\frac{1}{4}$ white	$\frac{3}{4} : \frac{1}{4}$

Here's another example for mixing juice and water:

1 part juice to 5 parts water	6 parts (1+ 5)
$\frac{1}{6}$ juice to $\frac{5}{6}$ water	$\frac{1}{6} : \frac{5}{6}$

Have a go at writing these ratios as fractions:

1. Use 1 shovel of cement to 3 shovels of sand.

2. Use 1 part screen wash to 9 parts water.

3. Use 1 cup oil to 2 cups sugar to 4 cups flour.
(Tip: add all the parts together as usual.)

4. Make 2 cups of tea to 1 cup of coffee.

5. Put out 1 chocolate biscuit to every 4 plain biscuits.

Now check your answers with the answer sheet.

Calculating bigger or smaller amounts

Understanding proportion can help in all kinds of calculations. It helps to work out the value or **amount of quantities** that are either **bigger or smaller** than the one you have information about.

Example: if the total cost of 3 packets of crisps is 75p, what is the cost of 5 packets?

1 packet is 25p (75p ÷ 3).
5 packets are £1.25 (5 × 25p).

Find out the cost of 1 item (÷).
Work out the cost of the number you want (×).
Check to see if the answer makes sense.

Now have a go at these questions:

1. If the cost of 5 rolls of camera film is £12.50, work out the cost of 8 rolls.

2. If the total cost of 15 tickets is £75, work out the cost of 8 tickets.

3. A recipe for flapjacks needs 60 g of oats and it makes 10 flapjacks.
   What quantity of oats is needed to make 24 flapjacks?

4. This list of ingredients is enough to make oat cookies for 10 people.
   How much of each ingredient would you need for 3 people?

200 g	margarine
10 drops	almond essence
10 tsp	golden syrup
250 g	rolled oats
100 g	brown sugar
200 g	wholewheat flour
1 tsp	baking powder

Now check your answers with the answer sheet.

1. A piece of wood is of length 45 cm.
The length is divided in the ratio 7 : 2

Work out the length of each part.

.... cm, ... cm

(3 marks)

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2. Alex and Ben were given a total of £240
They shared the money in the ratio 5 : 7

Work out how much money Ben received.

£ ....

(3 marks)

3. Ken and Susan share £20 in the ratio 1 : 3
Work out how much money each person gets.

Ken £ ....

Susan £ ....

(3 marks)

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4. Melissa is 13 years old.
Becky is 12 years old.
Daniel is 10 years old.

Melissa, Becky and Daniel share £28 in the ratio of their ages.
Becky gives a third of her share to her mother.

How much should Becky now have?

£ ....

(Total 4 marks)

5. Amy, Beth and Colin share 36 sweets in the ratio 2 : 3 : 4

Work out the number of sweets that each of them receives.

Amy………….sweets

Beth………….sweets

Colin…………..sweets

(3 marks)

6. A shop sells CDs and DVDs.
In one week the number of CDs sold and the number of DVDs sold were in the ratio 3:5
The total number of CDs and DVDs sold in the week was 728

Work out the number of CDs sold.

....

(3 marks)

7. The ratio of girls to boys in a school is 2 : 3

  (a) What fraction of these students are boys?

………………

                                  (2)

In Year 8 the ratio of girls to boys is 1 : 3

There are 300 students in Year 8.

  (b) Work out the number of girls in Year 8.

………………

                                  (3)

(5 marks)

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8. Ann and Bob shared £240 in the ratio 3 : 5

Ann gave a **half** of her share to Colin.

Bob gave a **tenth** of his share to Colin.

What fraction of the £240 did Colin receive?

....

(5 marks)

9. Peter won £75 as a prize.

He gave 4/5 of the prize money as a present to Roger and Bethan.

Roger and Bethan shared the present in the ratio 2:3

Work out how much they each got.

....

(4 marks)

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10. Rosa prepares the ingredients for pizzas.

She uses cheese, topping and dough in the ratio 2 : 3 : 5
Rose uses 70 grams of dough.

Work out the number of grams of cheese and the number of grams of topping Rosa uses.

Cheese .... g

Topping .... g

(Total 3 marks)

11. 5 schools sent some students to a conference.

One of the schools sent both boys and girls.
This school sent 16 boys.
The ratio of the number of boys it sent to the number of girls it sent was 1 : 2

The other 4 schools sent only girls.
Each of the 5 schools sent the same number of students.

Work out the total number of students sent to the conference by these 5 schools.

....

(4 marks)

12. Pat and Julie share some money in the ratio 2 : 5
Julie gets £45 more than Pat.

How much money did Pat get?

£...

(4 marks)

13. Last year Kerry's take home pay was £15 000
She spent 40% of her take home pay on rent.

She used the rest of her take home pay for living expenses, clothes and entertainment in the ratio 3 : 1 : 2

How much did Kerry spend on entertainment last year?

£..
(4 marks)

*14. Talil is going to make some concrete mix.
He needs to mix cement, sand and gravel in the ratio 1 : 3 : 5 by weight.

Talil wants to make 180 kg of concrete mix.

Talil has

    15 kg of cement
    85 kg of sand
    100 kg of gravel

Does Talil have enough cement, sand and gravel to make the concrete mix?

(4 marks)

15. Jim has only 5p coins and 10p coins.

The ratio of the number of 5p coins to the number of 10p coins is 2 : 3

Work out the ratio of

    the total value of the 5p coins : the total value of the 10p coins.

Give your answer in its simplest form.

(4 marks)