5.  Ben buys 21 football stickers for 84p. Calculate the cost of:

    (a)   7 stickers          (b)   12 stickers          (c)   50 stickers.

6.  A 20 m length of rope costs £14.40.

    (a)   Calculate the cost of 12 m of rope.

    (b)   What is the cost of the rope, per metre?

7.  A window cleaner charges $n$ pence to clean each window, and for a house with 9 windows he charges £4.95.

    (a)   What is $n$ ?

    (b)   Calculate the window cleaner's charge for a house with 13 windows.

8.  16 teams, each with the same number of people, enter a quiz. At the semifinal stage there are 12 people left in the competition.
    How many people entered the quiz?

9.  Three identical coaches can carry a total of 162 passengers. How many passengers in total can be carried on seven of these coaches?

10. The total mass of 200 concrete blocks is 1460 kg. Calculate the mass of 900 concrete blocks.

# 7.3  Proportional Division

Sometimes we need to divide something in a given ratio. Malcolm and Alison share the profits from their business in the ratio 2 : 3. This means that, out of every £5 profit, Malcolm gets £2 and Alison gets £3.

## Example 1

Julie and Jack run a stall at a car boot sale and take a total of £90. They share the money in the ratio 4 : 5. How much money does each receive?

## Solution

As the ratio is 4 : 5, first add these numbers together to see by how many parts the £90 is to be divided.

$4 + 5 = 9$, so 9 parts are needed.

Now divide the total by 9.

$\dfrac{90}{9} = 10$, so each part is £10.

Julie gets  4 parts  at £10,  giving  $4 \times £10 = £40$,

Jack gets  5 parts  at £10,  giving  $5 \times £10 = £50$.

## Example 2

Rachel, Ben and Emma are given £52.  They decide to divide the money in the ratio of their ages,  10 : 9 : 7.  How much does each receive?

### Solution

$10 + 9 + 7 = 26$  so  26 parts  are needed.

Now divide the total by 26.

$\dfrac{52}{26} = 2$,  so each part is  £2.

Rachel  gets  10 parts  at £2,  giving  $10 \times £2 = £20$

Ben     gets  9 parts  at £2,  giving  $9 \times £2 = £18$

Emma  gets  7 parts  at £2,  giving  $7 \times £2 = £14$

## Exercises

1.   (a)   Divide  £50  in the ratio  2 : 3.

     (b)   Divide  £100  in the ratio  1 : 4.

     (c)   Divide  £60  in the ratio  11 : 4.

     (d)   Divide  80 kg  in the ratio  1 : 3.

2.   (a)   Divide  £60  in the ratio  6 : 5 : 1.

     (b)   Divide  £108  in the ratio  3 : 4 : 5.

     (c)   Divide  30 kg  in the ratio 1 : 2 : 3.

     (d)   Divide  75 litres  in the ratio  12 : 8 : 5.

3.   Heidi and Briony get £80 by selling their old toys at a car boot sale.  They divide the money in the ratio  2 : 3.  How much money do they each receive?

4.   In a chemistry lab, acid and water are mixed in the ratio  1 : 5.  A bottle contains 216 ml of the mixture.  How much acid and how much water were needed to make this amount of the mixture?

5.   Blue and yellow paints are mixed in the ratio  3 : 5 to produce green.  How much of each of the two colours are needed to produce 40 ml of green paint?

6. Simon, Sarah and Matthew are given a total of £300. They share it in the ratio 10 : 11 : 9. How much does each receive?

7. In a fruit cocktail drink, pineapple juice, orange juice and apple juice are mixed in the ratio 7 : 5 : 4. How much of each type of juice is needed to make:

   (a) 80 ml of the cocktail,        (b) 1 litre of the cocktail?

8. Blue, red and yellow paints are mixed to produce 200 ml of another colour. How much of each colour is needed if they are mixed in the ratio:

   (a) 1 : 1 : 2,      (b) 3 : 3 : 2,      (c) 9 : 4 : 3 ?

9. To start up a small business, it is necessary to spend £800. Paul, Margaret and Denise agree to contribute in the ratio 8 : 1 : 7. How much does each need to spend?

10. Hannah, Grace and Jordan share out 10 biscuits so that Hannah has 2, Grace has 6 and Jordan has the remainder. Later they share out 25 biscuits in the same ratio. How many does each have this time?

# 7.4 Linear Conversion

The ideas used in this unit can be used for converting masses, lengths and currencies.

## Example 1

If £1 is worth 9 French francs, convert:

(a) £22 to Ff,      (b) 45 Ff to £,      (c) 100 Ff to £.

**Solution**

(a) $£22 = 22 \times 9$

$\quad\quad = 198$ Ff

(b) $1 \text{ Ff} = £\dfrac{1}{9}$

so $\quad 45 \text{ Ff} = 45 \times \dfrac{1}{9}$

$\quad\quad\quad\quad = \dfrac{45}{9}$

$\quad\quad\quad\quad = £5$