

## Exercise Solutions

### Exercise 1.1

a)  $0.28 = 28\%$

b)  $\frac{7}{9} = 77.78\%$

c)  $0.536 = 53.6\%$

### Exercise 1.2

a)  $34\% = 0.34$

b)  $63.91\% = 0.6391$

c)  $125\% = 1.25$

### Exercise 2.1

$$\frac{52 - 34}{34} = \frac{17}{34} = 0.5 = 50\%$$

### Exercise 2.2

Joey:  $\frac{30 - 24}{24} = \frac{6}{24} = 0.25 = 25\%$

Steve:  $\frac{18 - 12}{12} = \frac{6}{12} = 0.5 = 50\%$

$\therefore$  Joey will be buying pizza.

### Exercise 2.3

In total, the bakery is using  $150 \times 2 = 300$  chocolate chips.  $20\%$  of  $300 = 0.2 \times 300 = 60$   
 $\therefore$  The new amount of chocolate chips needed is  $300 + 60 = 360$ .

### Exercise 3.1

$$(25\text{mL})(0.45) + (75\text{mL})(0.37) = 39\text{mL} \implies \frac{39\text{mL}}{100\text{mL}} = 0.39 = 39\% \text{ acidic solution}$$

### Exercise 3.2

Let  $c$  be the concentration of the orange juice.

$$(2050)(0.88) = (1000)(0.84) + (1050)c$$

$$1804 = 840 + (1050)c$$

$$964 = (1050)c$$

$$c = \frac{964}{1050}$$

$$c = 0.9181 = 90.81\%$$

The concentration of the orange juice is about  $90.81\%$ .

### Exercise 4.1

a)  $3 \times (6 : 5) = 18 : 15 \therefore$  this ratio is proportional

b)  $2 \times (7 : 15) = 14 : 30 \therefore$  this ratio is not proportional

c)  $\frac{6}{6} \times \frac{3}{8} = \frac{18}{48} \therefore$  this ratio is proportional

d)  $7 \times (9 : 11) = 63 : 77 \therefore$  this ratio is proportional

**Exercise 4.2**

$$\begin{aligned} \text{a)} \quad \frac{3}{4} &= \frac{x}{28} \\ \frac{3}{4} \times 28 &= x \\ \frac{3}{1} \times 4 &= x \\ x &= 12 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad \frac{11}{12} &= \frac{121}{x} \\ 11x &= (121)(12) \\ x &= \frac{(121)(12)}{11} \\ x &= (11)(12) \\ x &= 132 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad \frac{x}{9} &= \frac{15}{27} \\ x &= \frac{15}{27} \times 9 \\ x &= \frac{15}{3} \\ x &= 5 \end{aligned}$$

**Exercise 4.3**

April:  $18 : 21 = 6 : 7$

May:  $12 : 14 = 6 : 7$

$\therefore$  the two ratios are proportional

**Exercise 4.4**

12 year olds:  $24 : 32 = 3 : 4$

13 year olds:  $18 : 36 = 1 : 2$

Since  $\frac{1}{2} < \frac{3}{4}$ , the 13 year old group has a lower ratio of green belts to blue belts.

## Problem Set Solutions

1. Splitting the square into 8 congruent pieces, we have . By counting the triangles,

we see that the shaded area is  $\frac{2}{8} = \frac{1}{4}$  of the square.

2.  $25.95 + (0.13)(25.95) = \$29.32$

3.  $\frac{9}{10} = 0.90$        $\frac{46}{50} = 0.92$        $\frac{21}{25} = 0.84$        $\frac{4}{5} = 0.80$        $96\% = 0.96$

The best score is 96%.

4.  $6000 - (0.03)(6000) = 5820$  cans were collected this year.

5.  $\$2.50 - (\$2.50)(0.4) = \$1.50$

6.  $\frac{(25)(30) - (20)(25)}{(20)(25)} = 50\%$

7.  $\$750 - (\$750)(0.2) = \$600$   
 $\$600 + (\$600)(0.2) = \$720$   $\therefore$  The final price is \$720

8.  $24 \div \frac{3}{4} \times \frac{4}{5} = 25.6$
9.  $(0.6)(20 + 25 + 30) - 20 = 25$  games
10.  $600 \times (1 - 0.22 - 0.16 - 0.30) = 192$  people
11.  $\frac{4 \times 6}{1 + 2} - 5 = 3$
12.  $\left(\frac{3}{2 + 3}\right)(25) + 3 = 18 \Rightarrow 18 : 10 = 9 : 5$
13. Area of rectangle:  $2 \times 4 = 8\text{cm}^2$ ; Area of square:  $3 \times 3 = 9\text{cm}^2 \Rightarrow 8 : 9$
14. Let  $h, c$  and  $p$  be the number of troughs occupied by horses, cows and pigs respectively.  
 We have  $2h = 3c \Rightarrow h = \frac{3}{2}c$ . Similarly,  $p = \frac{3}{8}c$ .  
 $69 = h + c + p = \frac{3}{2}c + c + \frac{3}{8}c = \frac{23}{8}c$   
 $\Rightarrow 3c = \frac{(69)(8)}{23} \times 3 = 72 \Rightarrow 3 \times 72 = 216$  animals
15.  $\frac{a}{b} = \frac{3}{4} \Rightarrow b = \frac{4}{3}a$        $\frac{a}{b + c} = \frac{2}{5} \Rightarrow b = \frac{5}{2}a - c$   
 $\frac{4}{3}a = \frac{5}{2}a - c \Rightarrow c = \frac{7}{6}a$   
 $a : c = a : \frac{7}{6}a = 6 : 7$
16. Gabe saves 40%, so his expenses are 60% of his income, or  $(60\%) \times \frac{5}{8} = 37.5\%$  of Heidi's income. This is one-half of Heidi's expenses, so we know Heidi's expenses are  $2 \times 37.5\% = 75\%$  of her income, which means she saves 25% of her income.