

# Solutions

1. Express each fraction as a decimal and as a percent.

a)  $\frac{1}{4}$

c)  $\frac{2}{3}$

b)  $\frac{5}{6}$

d)  $\frac{13}{20}$

a)  $\frac{1}{4} \rightarrow 1 \div 4 = 0.25 \xrightarrow{\times 100} 25\%$

b)  $\frac{5}{6} \rightarrow 5 \div 6 = 0.8\bar{3} \xrightarrow{\times 100} 83.\bar{3}\%$

c)  $\frac{2}{3} \rightarrow 2 \div 3 = 0.\bar{6} \xrightarrow{\times 100} 66.\bar{6}\%$

d)  $\frac{13}{20} \rightarrow 13 \div 20 = 0.65 \xrightarrow{\times 100} 65\%$

2. Express each fraction in lowest terms.

a)  $\frac{9}{12}$

c)  $\frac{22}{35}$

b)  $\frac{13}{52}$

d)  $\frac{16}{36}$

$$a) \frac{9}{12} \text{ (HCF 3)} \rightarrow \div \frac{3}{3} = \frac{3}{4}$$

$$b) \frac{13}{52} \text{ (HCF 13)} \rightarrow \div \frac{13}{13} = \frac{1}{4}$$

$$c) \frac{22}{35} \text{ (HCF 1)} \rightarrow \div \frac{1}{1} = \frac{22}{35}$$

$$d) \frac{16}{36} \text{ (HCF 4)} \rightarrow \div \frac{4}{4} = \frac{4}{9}$$

3. Add or subtract the following. Express your answer as a fraction in lowest terms, as a decimal, and as a percent.

a)  $\frac{1}{6} + \frac{1}{3}$

c)  $\frac{3}{4} - \frac{1}{3}$

b)  $\frac{1}{4} + \frac{4}{6}$

d)  $1 - \frac{1}{4}$

$$a) \frac{1}{6} + \frac{1}{3} \left. \begin{array}{l} \downarrow \\ \times 2 \end{array} \right\} = \frac{1}{6} + \frac{2}{6}$$

$$= \frac{3}{6} \text{ (HCF 3)}$$

$$= \frac{1}{2}$$

$$\rightarrow 1 \div 2 = 0.5 \xrightarrow{\times 100} 50\%$$

$$b) \frac{1}{4} + \frac{4}{6} \left. \begin{array}{l} \downarrow \\ \times 3 \end{array} \right\} = \frac{3}{12} + \frac{8}{12}$$

$$= \frac{11}{12}$$

$$\rightarrow 11 \div 12 = 0.91\bar{6} \xrightarrow{\times 100} 91.6\%$$

$$c) \frac{3}{4} - \frac{1}{3} \left. \begin{array}{l} \downarrow \\ \times 12 \end{array} \right\} = \frac{9}{12} - \frac{4}{12}$$

$$= \frac{5}{12}$$

$$\rightarrow 5 \div 12 = 0.41\bar{6} \xrightarrow{\times 100} 41.6\%$$

$$d) 1 - \frac{1}{4} = \frac{4}{4} - \frac{1}{4}$$

$$= \frac{3}{4}$$

$$\rightarrow 3 \div 4 = 0.75 \xrightarrow{\times 100} 75\%$$

4. Multiply. Express your answer as a fraction in lowest terms, as a decimal, and as a percent.

a)  $\frac{1}{6} \times \frac{1}{2}$

b)  $\frac{1}{4} \times \frac{2}{3}$

c)  $\frac{2}{3} \times \frac{5}{6}$

d)  $\frac{5}{12} \times \frac{3}{10}$

a)  $\frac{1}{6} \times \frac{1}{2}$

$$= \frac{1 \times 1}{6 \times 2}$$

$$= \frac{1}{12}$$

$$\rightarrow 1 \div 12 = 0.08\bar{3} \xrightarrow{\times 100} 8.\bar{3}\%$$

c)  $\frac{2}{3} \times \frac{5}{6}$

$$= \frac{2 \times 5}{3 \times 6}$$

$$= \frac{10}{18} \text{ (HCF 2)}$$

$$= \frac{5}{9}$$

$$\rightarrow 5 \div 9 = 0.\bar{5} \xrightarrow{\times 100} 55.\bar{5}\%$$

b)  $\frac{1}{4} \times \frac{2}{3}$

$$= \frac{1 \times 2}{4 \times 3}$$

$$= \frac{2}{12} \text{ (HCF 2)}$$

$$= \frac{1}{6}$$

$$\rightarrow 1 \div 6 = 0.\bar{16} \xrightarrow{\times 100} 16.\bar{6}\%$$

d)  $\frac{5}{12} \times \frac{3}{10}$

$$= \frac{5 \times 3}{12 \times 10}$$

$$= \frac{15}{120} \text{ (HCF 15)}$$

$$= \frac{1}{8}$$

$$\rightarrow 1 \div 8 = 0.125 \xrightarrow{\times 100} 12.5\%$$

5. A bag contains 3 red counters, 2 blue counters, and 5 yellow counters.

a) Write a ratio that expresses the number of red counters to the total number of counters.

b) Repeat a) for the other two colours. Write each ratio in lowest terms.

c) What percent of the total number of counters does each colour represent?

$$\text{Total} = 3 + 2 + 5 = 10 \text{ counters}$$

a) Red : Total  
$$3 : 10$$

c) Red =  $\frac{3}{10}$   
$$= 30\%$$

b) Blue : Total  
$$2 : 10$$
  
$$= 1 : 5$$

Blue =  $\frac{1}{5}$   
$$= 20\%$$

Yellow : Total  
$$5 : 10$$
  
$$= 1 : 2$$

Yellow =  $\frac{1}{2}$   
$$= 50\%$$

6. A baseball player has 10 hits in 35 times at bat.
- a) Express the ratio of hits to times at bat in fraction form.
- b) Convert the fraction to a decimal, rounded to three decimal places.
- c) Use proportional reasoning to estimate the number of hits this player would have in 400 times at bat.

$$a) \frac{\text{Hits}}{\text{Bats}} = \frac{10}{35} = \frac{2}{7}$$

$$b) 2 \div 7 = 0.286$$

$$c) P(\text{Hit}) \times \text{attempts} \\ = 0.286 \times 400 \\ = 114.4 \approx 114 \text{ hits}$$

A random act is an occurrence in which the outcome is unpredictable.

7. Classify each act as either random or non-random. Explain your reasoning.

- a) Flipping a coin  
 b) Safely entering a traffic intersection  
 c) Looking into a box and picking your favourite candy  
 d) Reaching into a box and picking a candy without looking

a) Random - can't control the outcome.

b) Non-random - should only choose to enter when safe.

c) Non-random - you have chosen after looking

d) Random - you don't know the options.

8. a) Describe a random act scenario in a board game.  
 b) Describe a scenario that involves a non-random act.

a) Rolling a double to get out of jail.

b) Deliberately choosing which clothes to wear.

9. A standard deck of playing cards has four suits: clubs, diamonds, hearts, and spades.

- a) What fraction of the deck are spades?  
 b) Face cards are any cards showing a face, namely a jack, queen, or king. What percent of the deck are red face cards?

a) Four suits  
 $\Rightarrow P(\text{spades}) = \frac{1}{4}$

b) J, Q, K of hearts or diamonds

$$\begin{aligned} \Rightarrow P(\text{Red face}) &= \frac{6}{52} \\ &= \frac{3}{26} \end{aligned}$$

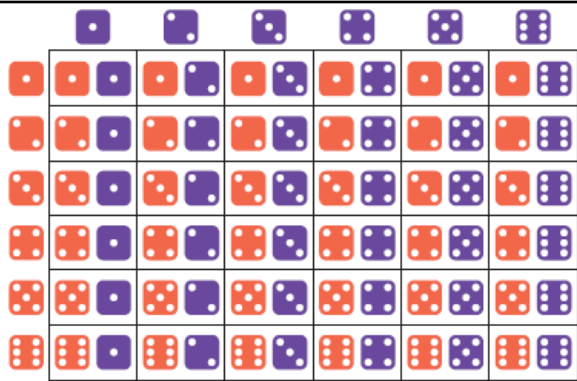
$$\begin{aligned} 3 \div 26 &= 0.115 \times 100 \\ &= 11.5\% \end{aligned}$$



10. When you throw a pair of standard dice, the value shown on the upper faces gives the outcome of that throw. The following table illustrates all possible outcomes.

List and count all the ways each of the following sums could occur.

a) 2    b) 7    c) 1  
 d) doubles (both dice produce the same value)  
 e) a perfect square



a) (1,1) way

b) (1,6) (2,5) (3,4) (4,3) (5,2) (6,1) 7 ways

c) Impossible (minimum sum is 2)

d) (1,1) (2,2) (3,3) (4,4) (5,5) (6,6) 6 ways

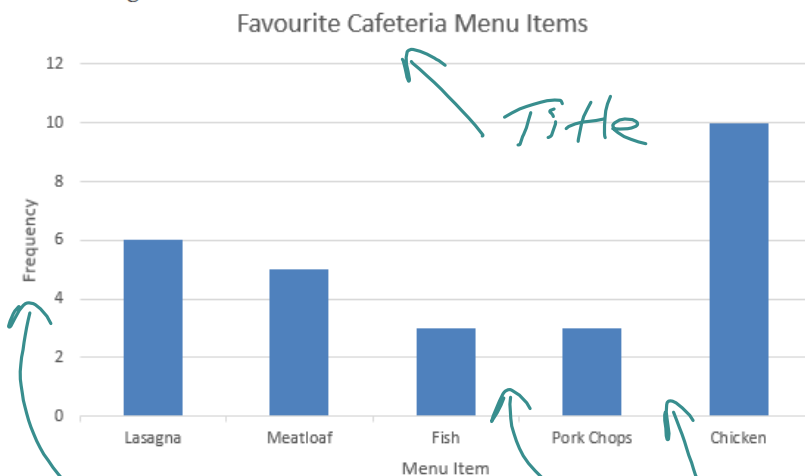
e) (1,3) (2,2) (3,1) (3,6) (4,5) (5,4) (6,3) 7 ways  
 Total of 4                      Total of 9

11. Construct a bar graph to represent the data.

A class was surveyed to determine the students' favourite cafeteria menu items. The tally sheet shows the results.

Menu Item	Favourite
Lasagna	HHH   6
Meatloaf	HHH 5
Fish	III 3
Pork chops	III 3
Chicken	HHH HHH 10

12. a) Which meal is the class's favourite? What percent of the class chose this meal?  
 b) What fraction of the class did not choose lasagna?



Total = 27  
 Favourite meal is Chicken  
 $\Rightarrow 10 \div 27 = 37\%$

Lasagna =  $\frac{6}{27}$   
 $\Rightarrow$  Not lasagna  
 $= \frac{27}{27} - \frac{6}{27}$   
 $= \frac{21}{27} = \frac{7}{9}$