

## Mixed Numbers and Improper Fractions

A **proper fraction** has a numerator smaller than its denominator.

$\frac{2}{3}$  is a proper fraction.

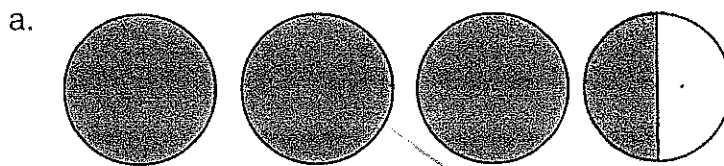
A **mixed number** is made up of a whole number and a proper fraction.

whole number →  $3\frac{2}{5}$  is a mixed number.  
↑  
proper fraction

An **improper fraction** has a numerator bigger than its denominator.

$\frac{3}{2}$  is an improper fraction.

**Example 1** Write the fraction shaded in each of the following as a mixed number.



**Solution:** There are 3 whole circles plus 1 half of a circle.

$$\text{Answer} = 3\frac{1}{2}$$

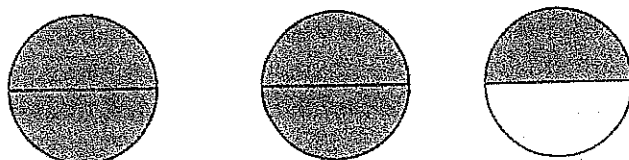


**Solution:** There are 4 whole rectangles plus 1 third of a rectangle.

$$\text{Answer:} = 4\frac{1}{3}$$

**Example 2** Use the diagrams to write each mixed number as an improper fraction.

a.  $2\frac{1}{2} = ?$



**Solution:** To write  $2\frac{1}{2}$  as an improper fraction we count how many halves there are in 2 whole numbers then add an extra half. There are 4 halves in 2 so  $2\frac{1}{2}$  must equal 5 halves.

Answer =  $\frac{5}{2}$

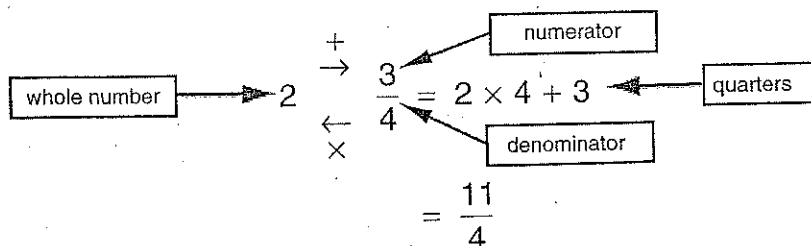
b.  $2\frac{2}{3} = ?$



**Solution:** There are 6 thirds in 2 whole numbers. So there are 8 thirds in  $2\frac{2}{3}$ .

Answer =  $\frac{8}{3}$

An easier way to change mixed numbers to improper fractions is to: Multiply the whole number by the denominator and add the numerator.



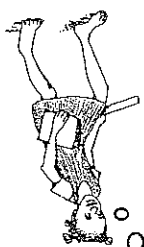
**Example 3**

Change the following mixed numbers to improper fractions.

a.  $2\frac{1}{5}$

Solution:  $2\frac{1}{5} = 2 \times 5 + 1 \text{ fifths}$

Whole number times denominator plus the numerator.



Answer =  $\frac{11}{5}$

b.  $6\frac{2}{3}$

Solution:  $6\frac{2}{3} = 6 \times 3 + 2 \text{ thirds}$

Answer =  $\frac{20}{3}$

**Example 4**

Write the following improper fractions as mixed numbers

a.  $\frac{4}{5}$

Solution: To write an improper fraction as a mixed number we must first of all find how many whole numbers there are and how much remains.

So in  $\frac{4}{5}$ , 4 quarters make 1 whole and 1

quarter remains.

So,  $\frac{4}{5} = 1\frac{1}{5}$ .

i.e. 5 quarters = 1 whole plus 1 quarter.

b.  $\frac{22}{4}$

Solution: This could also be done by division:

$4 \overline{)22}$  numerator ÷ denominator  
5 remainder 2

$\frac{20}{4}$

So,  $\frac{22}{4} = 5 + \frac{2}{4}$

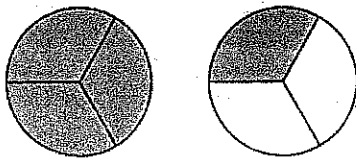
=  $5\frac{1}{2}$

Sometimes you need to simplify the fraction part by cancelling.  $\frac{2}{4}$  can be simplified by cancelling by 2.

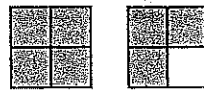
## EXERCISE 2.4

1. Write the fraction shaded below as mixed numbers:

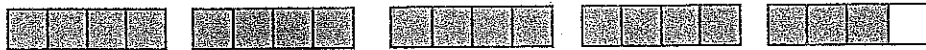
a.



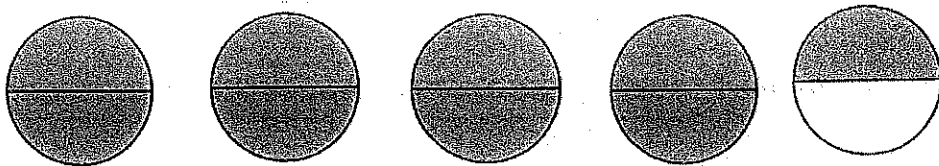
b.



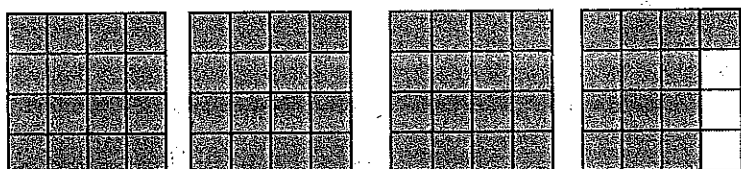
c.



d.



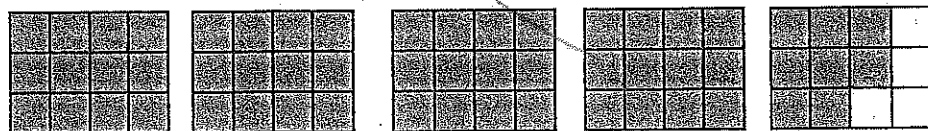
e.



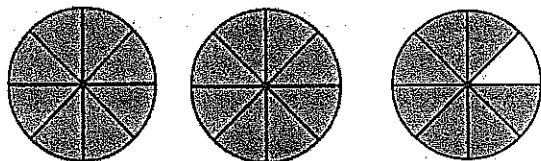
f.



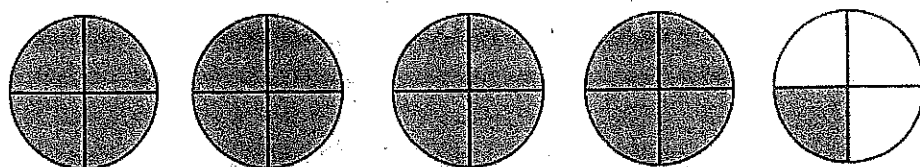
g.



h.



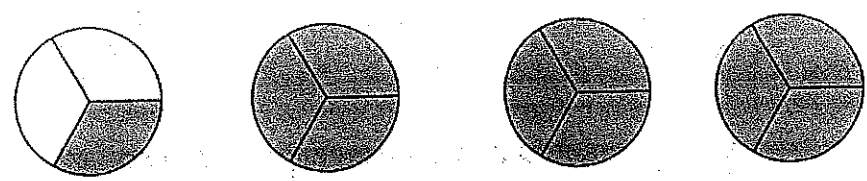
i.



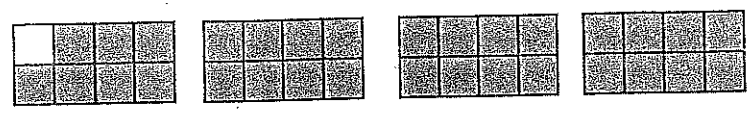
j.



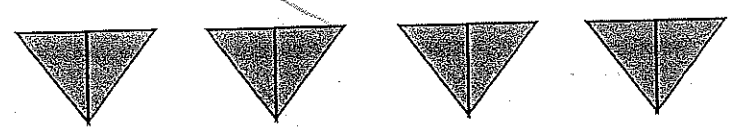
Look at the diagrams below and complete these equations.



$$\frac{3}{3} = \frac{1}{?}$$



$$\frac{3}{7} = \frac{?}{8}$$



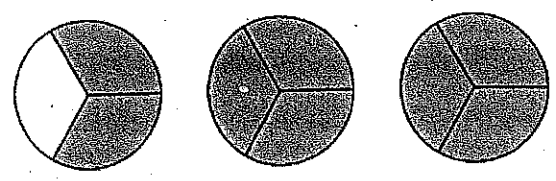
$$4 = \frac{?}{2}$$



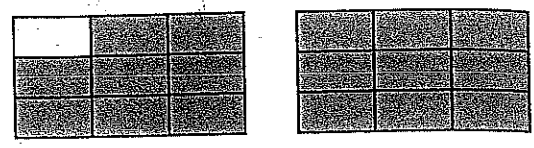
$$\frac{4}{4} = \frac{1}{?}$$



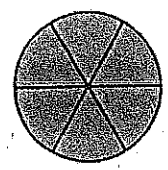
$$? = \frac{2}{3}$$



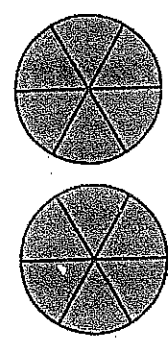
$$? = \frac{3}{8}$$



$$? = \frac{9}{17}$$



$$? = \frac{6}{18}$$



h

g.

f.

e.

d.

c.

b.

a.

**EXERCISE 2.4 (continued)**

3. Change the mixed numbers into improper fractions:

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

g.  $3\frac{1}{8}$

m.  $8\frac{3}{5}$

s.  $8\frac{5}{11}$

b.  $4\frac{3}{7}$

h.  $2\frac{3}{8}$

n.  $7\frac{3}{4}$

t.  $9\frac{6}{11}$

c.  $2\frac{3}{5}$

b.  $5\frac{2}{3}$

o.  $12\frac{4}{7}$

u.  $5\frac{7}{12}$

d.  $6\frac{1}{2}$

j.  $8\frac{1}{9}$

p.  $11\frac{5}{8}$

v.  $9\frac{7}{10}$

e.  $2\frac{2}{3}$

k.  $3\frac{5}{8}$

q.  $10\frac{4}{9}$

w.  $3\frac{5}{13}$

f.  $3\frac{5}{6}$

l.  $5\frac{7}{9}$

r.  $7\frac{5}{12}$

x.  $2\frac{13}{14}$

4. Write the following improper fractions as mixed numbers:

a.  $\frac{7}{2}$

g.  $\frac{7}{5}$

n.  $\frac{41}{6}$

s.  $\frac{18}{4}$

b.  $\frac{11}{3}$

h.  $\frac{21}{4}$

o.  $\frac{45}{8}$

t.  $\frac{30}{12}$

c.  $\frac{7}{4}$

i.  $\frac{10}{7}$

p.  $\frac{54}{11}$

u.  $\frac{22}{6}$

d.  $\frac{15}{4}$

j.  $\frac{32}{9}$

q.  $\frac{50}{7}$

v.  $\frac{21}{12}$

e.  $\frac{17}{10}$

k.  $\frac{25}{8}$

r.  $\frac{15}{6}$

w.  $\frac{14}{8}$

f.  $\frac{13}{5}$

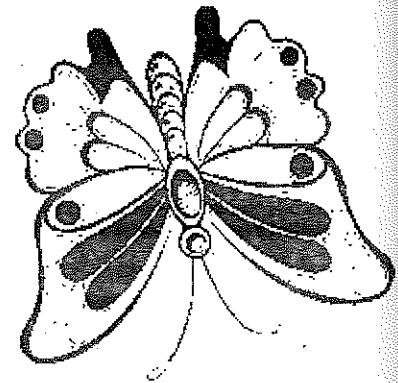
l.  $\frac{30}{7}$

s.  $\frac{24}{9}$

x.  $\frac{12}{9}$

5. Copy the answer grid at the bottom of the puzzle into your book.  
 Change the improper fractions to mixed numbers to find the code which will solve the riddle.

Why weren't the butterflies allowed to dance?



$\frac{15}{4}$	a	$\frac{16}{5}$	t
$\frac{17}{5}$	a	$\frac{19}{3}$	w
$\frac{18}{7}$	o	$\frac{21}{6}$	l
$\frac{9}{4}$	i	$\frac{87}{9}$	a
$\frac{28}{5}$	h	$\frac{38}{7}$	t
$\frac{36}{7}$	b	$\frac{62}{5}$	l
$\frac{15}{2}$	s	$\frac{34}{8}$	m

$2\frac{1}{4}$	$5\frac{3}{7}$	$6\frac{1}{3}$	$3\frac{4}{3}$	$7\frac{1}{2}$	$9\frac{2}{3}$	$4\frac{1}{4}$	$2\frac{4}{7}$	$3\frac{1}{5}$	$5\frac{3}{5}$	$5\frac{1}{7}$	$3\frac{2}{5}$	$3\frac{1}{2}$	$12\frac{2}{5}$
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### EXERCISE 2.4 (continued)

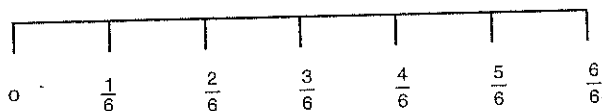
6. Fill in the missing number to give equivalent improper fractions:

- |    |                              |    |                               |    |                               |    |                                 |
|----|------------------------------|----|-------------------------------|----|-------------------------------|----|---------------------------------|
| a. | $\frac{6}{5} = \frac{?}{10}$ | g. | $\frac{7}{5} = \frac{?}{25}$  | m. | $\frac{12}{5} = \frac{60}{?}$ | s. | $\frac{90}{10} = \frac{?}{90}$  |
| b. | $\frac{9}{8} = \frac{18}{?}$ | h. | $\frac{12}{4} = \frac{?}{12}$ | n. | $\frac{13}{5} = \frac{?}{15}$ | t. | $\frac{42}{35} = \frac{?}{70}$  |
| c. | $\frac{3}{2} = \frac{?}{10}$ | i. | $\frac{11}{3} = \frac{33}{?}$ | o. | $\frac{17}{4} = \frac{?}{12}$ | u. | $\frac{60}{32} = \frac{120}{?}$ |
| d. | $\frac{7}{3} = \frac{?}{21}$ | j. | $\frac{8}{7} = \frac{?}{35}$  | p. | $\frac{15}{6} = \frac{45}{?}$ | v. | $\frac{50}{30} = \frac{150}{?}$ |
| e. | $\frac{5}{4} = \frac{15}{?}$ | k. | $\frac{15}{7} = \frac{30}{?}$ | q. | $\frac{13}{3} = \frac{39}{?}$ | w. | $\frac{81}{30} = \frac{?}{90}$  |
| f. | $\frac{7}{2} = \frac{28}{?}$ | l. | $\frac{11}{4} = \frac{33}{?}$ | r. | $\frac{14}{8} = \frac{?}{32}$ | x. | $\frac{73}{50} = \frac{?}{150}$ |

### Ordering Fractions

Fractions can be compared using a number line; bigger fractions are to the right, smaller fractions to the left.

**Example 1** Using the number line, say which of the two fractions is bigger.



a.  $\frac{5}{6}$  and  $\frac{3}{6}$

$\frac{5}{6}$  is to the right of  $\frac{3}{6}$  so it is bigger.

Answer:  $\frac{5}{6}$  is bigger

b.  $\frac{2}{6}$  and  $\frac{6}{6}$

$\frac{6}{6}$  is to the right of  $\frac{2}{6}$  so it is bigger

Answer:  $\frac{6}{6}$  is bigger



We can compare fractions with the same denominators by comparing the numerators.

Consider  $\frac{3}{8}$  and  $\frac{7}{8}$ . They have the same denominator.

Look at the numerators. Since 7 is bigger than 3,  $\frac{7}{8}$  is bigger than  $\frac{3}{8}$ .

**Example 2**

Put in < or > to make the statement true.

Put in < or > to make the statement true.

a.

$\frac{4}{5} ? \frac{2}{5}$

Answer:

$\frac{4}{5} > \frac{2}{5}$

b.

$\frac{3}{6} ? \frac{7}{7}$

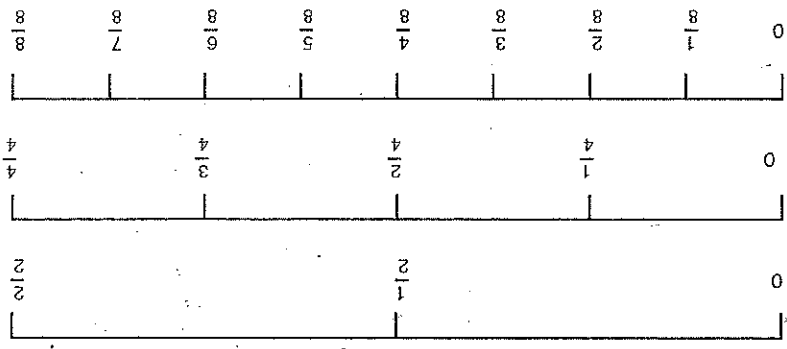
Answer:

$\frac{3}{6} < \frac{7}{7}$  (Since  $3 < 6$ )

**Remember:**  
 > means 'bigger than'  
 < means 'smaller than'

Since the denominators are the same we look at the numerators. 4 is bigger than 2

We can compare fractions with different denominators using number lines.



From the number lines we can see that:

$\frac{1}{4} < \frac{1}{8}$

$\frac{1}{8}$  is to the left of  $\frac{1}{4}$  so it is smaller.

$\frac{1}{3} > \frac{2}{8}$

$\frac{1}{2}$  is to the right of  $\frac{3}{8}$  so it is bigger.

**Example 3** Using the number lines, write down the following fractions from smallest to biggest.

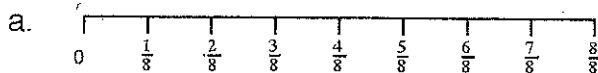
$$\frac{3}{4}, \frac{3}{8}, \frac{1}{2}, \frac{1}{4}, \frac{5}{8}, \frac{4}{4}$$

Solution: Looking at the number lines, we work out the order in which the fractions above appear from left to right.

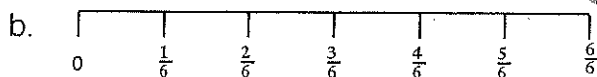
Answer:  $\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, \frac{4}{4}$

### Exercise 2.5

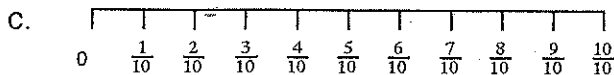
1. Look at each number line. Replace  $\square$  with  $>$  or  $<$ .



i.  $\frac{5}{8} \square \frac{3}{8}$     ii.  $\frac{8}{8} \square \frac{6}{8}$     iii.  $\frac{2}{8} \square \frac{6}{8}$     iv.  $\frac{4}{8} \square \frac{8}{8}$



i.  $\frac{1}{6} \square \frac{4}{6}$     ii.  $\frac{6}{6} \square \frac{5}{6}$     iii.  $\frac{3}{6} \square \frac{5}{6}$     iv.  $\frac{3}{6} \square \frac{4}{6}$



i.  $\frac{9}{10} \square \frac{7}{10}$     ii.  $\frac{3}{10} \square \frac{10}{10}$     iii.  $\frac{1}{10} \square \frac{2}{10}$     iv.  $\frac{8}{10} \square \frac{9}{10}$

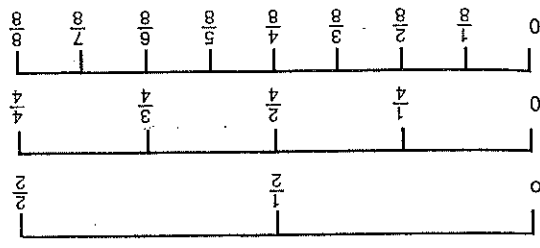
2. Compare these fractions. Replace  $\square$  with  $>$  or  $<$ .

- a.  $\frac{3}{5} \square \frac{10}{5}$
- b.  $\frac{1}{2} \square \frac{2}{2}$
- c.  $\frac{5}{4} \square \frac{8}{4}$
- d.  $\frac{3}{2} \square \frac{4}{2}$
- e.  $\frac{2}{1} \square \frac{3}{1}$
- f.  $\frac{1}{4} \square \frac{5}{4}$
- g.  $\frac{5}{2} \square \frac{5}{2}$
- h.  $\frac{3}{1} \square \frac{7}{1}$
- i.  $\frac{7}{10} \square \frac{7}{10}$
- j.  $\frac{9}{9} \square \frac{9}{9}$
- k.  $\frac{9}{10} \square \frac{10}{10}$
- l.  $\frac{4}{10} \square \frac{12}{10}$
- m.  $\frac{5}{3} \square \frac{12}{3}$
- n.  $\frac{4}{1} \square \frac{12}{1}$
- o.  $\frac{5}{1} \square \frac{5}{1}$
- p.  $\frac{14}{4} \square \frac{15}{4}$
- q.  $\frac{20}{19} \square \frac{20}{19}$
- r.  $\frac{5}{3} \square \frac{16}{3}$
- s.  $\frac{40}{42} \square \frac{50}{50}$
- t.  $\frac{91}{54} \square \frac{100}{100}$

3. Put the following fractions in order of smallest to biggest:

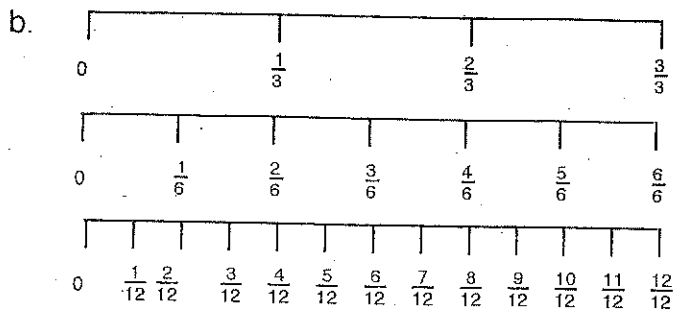
- a.  $\frac{1}{4}, \frac{4}{3}$
- b.  $\frac{5}{6}, \frac{1}{6}, \frac{6}{6}, \frac{6}{6}$
- c.  $\frac{4}{2}, \frac{2}{5}, \frac{7}{7}, \frac{7}{7}$
- d.  $\frac{7}{9}, \frac{3}{10}, \frac{10}{10}, \frac{10}{10}$
- e.  $\frac{7}{1}, \frac{8}{11}, \frac{11}{11}, \frac{11}{11}$
- f.  $\frac{5}{7}, \frac{7}{1}, \frac{13}{13}, \frac{13}{13}$
- g.  $\frac{7}{9}, \frac{10}{20}, \frac{20}{20}, \frac{20}{20}$
- h.  $\frac{15}{16}, \frac{2}{17}, \frac{17}{17}, \frac{17}{17}$
- i.  $\frac{15}{13}, \frac{13}{19}, \frac{23}{23}, \frac{23}{23}$
- j.  $\frac{4}{5}, \frac{13}{40}, \frac{41}{41}, \frac{41}{41}$
- k.  $\frac{13}{21}, \frac{21}{40}, \frac{41}{41}, \frac{41}{41}$
- l.  $\frac{4}{5}, \frac{5}{42}, \frac{59}{59}, \frac{59}{59}$

4. Using the number lines, replace  $\square$  with  $=$ ,  $<$  or  $>$ .



- I.  $\frac{1}{3} \square \frac{2}{4}$
- II.  $\frac{2}{1} \square \frac{8}{2}$
- V.  $\frac{3}{1} \square \frac{8}{4}$
- VIII.  $\frac{1}{5} \square \frac{2}{8}$
- IV.  $\frac{5}{3} \square \frac{8}{4}$
- VII.  $\frac{3}{5} \square \frac{4}{8}$
- III.  $\frac{1}{4} \square \frac{4}{8}$
- VI.  $\frac{3}{6} \square \frac{4}{8}$

## Exercise 2.5 (continued)



i.  $\frac{1}{3} \square \frac{1}{6}$

ii.  $\frac{2}{6} \square \frac{4}{12}$

iii.  $\frac{1}{12} \square \frac{1}{6}$

iv.  $\frac{2}{12} \square \frac{1}{3}$

v.  $\frac{7}{12} \square \frac{1}{3}$

vi.  $\frac{2}{3} \square \frac{7}{12}$

vii.  $\frac{8}{12} \square \frac{3}{6}$

viii.  $\frac{3}{6} \square \frac{6}{12}$

ix.  $\frac{6}{6} \square \frac{11}{12}$

x.  $\frac{5}{12} \square \frac{5}{6}$

xi.  $\frac{10}{12} \square \frac{4}{6}$

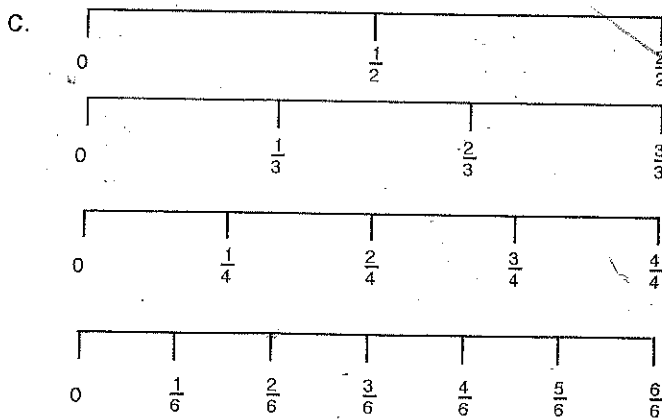
xiii.  $\frac{9}{12} \square \frac{4}{6}$

xiv.  $\frac{2}{3} \square \frac{8}{12}$

xv.  $\frac{9}{12} \square \frac{2}{3}$

xvi.  $\frac{3}{12} \square \frac{2}{6}$

xvii.  $\frac{4}{6} \square \frac{8}{12}$



i.  $\frac{1}{2} \square \frac{1}{3}$

ii.  $\frac{1}{4} \square \frac{2}{6}$

iii.  $\frac{4}{6} \square \frac{1}{2}$

iv.  $\frac{2}{3} \square \frac{1}{2}$

v.  $\frac{5}{6} \square \frac{3}{4}$

vi.  $\frac{2}{3} \square \frac{4}{6}$

vii.  $\frac{1}{4} \square \frac{1}{3}$

viii.  $\frac{6}{6} \square \frac{3}{4}$

ix.  $\frac{2}{6} \square \frac{1}{2}$

x.  $\frac{1}{6} \square \frac{1}{4}$

xi.  $\frac{4}{6} \square \frac{2}{4}$

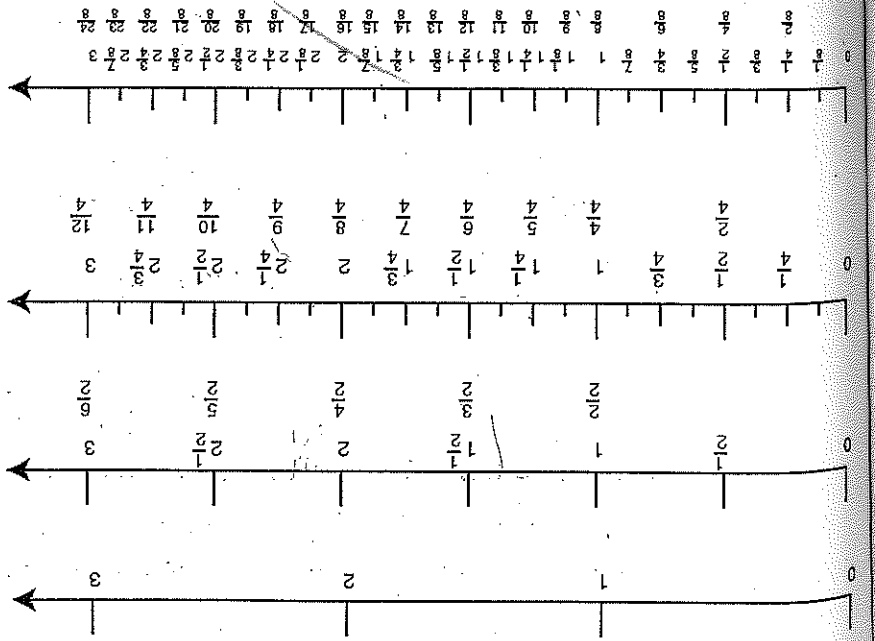
xii.  $\frac{4}{6} \square \frac{3}{4}$

xiii.  $\frac{3}{6} \square \frac{3}{4}$

xiv.  $\frac{2}{3} \square \frac{3}{4}$

xv.  $\frac{3}{3} \square \frac{6}{6}$

5. Use these number lines to help you.



6. Choose the largest fraction from each pair.

- I.  $\frac{4}{2}$ ,  $\frac{3}{3}$       II.  $\frac{4}{3}$ ,  $\frac{5}{5}$       III.  $\frac{7}{5}$ ,  $\frac{4}{4}$       IV.  $\frac{11}{9}$ ,  $\frac{10}{10}$
- V.  $\frac{3}{7}$ ,  $\frac{8}{8}$       VI.  $\frac{1}{1}$ ,  $\frac{2}{4}$       VII.  $\frac{3}{3}$ ,  $\frac{8}{4}$       VIII.  $\frac{1}{1}$ ,  $\frac{2}{8}$
- IX.  $\frac{2}{5}$ ,  $\frac{5}{5}$       X.  $\frac{6}{5}$ ,  $\frac{5}{5}$       XI.  $\frac{5}{2}$ ,  $\frac{2}{2}$       XII.  $\frac{5}{6}$ ,  $\frac{7}{7}$

Use the correct symbol (<, >, =) to make the statement true.

- I.  $\frac{4}{3}$   $\square$   $\frac{4}{4}$       II.  $\frac{2}{4}$   $\square$   $\frac{4}{8}$       III.  $\frac{1}{1}$   $\square$   $\frac{3}{8}$       IV.  $\frac{5}{5}$   $\square$   $\frac{4}{8}$
- V.  $\frac{8}{3}$   $\square$   $\frac{4}{3}$       VI.  $\frac{4}{9}$   $\square$   $\frac{4}{2}$       VII.  $\frac{6}{4}$   $\square$   $\frac{3}{2}$       VIII.  $\frac{2}{3}$   $\square$   $\frac{8}{3}$
- IX.  $\frac{8}{4}$   $\square$   $\frac{4}{5}$       X.  $\frac{4}{3}$   $\square$   $\frac{6}{8}$       XI.  $\frac{2}{1}$   $\square$   $\frac{6}{3}$       XII.  $\frac{1}{1}$   $\square$   $\frac{7}{3}$

We can compare fractions with different denominators without drawing them on a number line.

To compare fractions with different denominators, we must change them into equivalent fractions. We must write each fraction so they have the same denominator.

Let us look at  $\frac{1}{3}$  and  $\frac{5}{6}$ .

To compare the fractions we take the fraction with the smaller denominator,  $\frac{1}{3}$ , and change to its equivalent in sixths.

$$\frac{1}{3} = \frac{2}{6}$$

Since  $\frac{1}{3} = \frac{2}{6}$ , we can say that  $\frac{2}{6}$  is smaller than  $\frac{5}{6}$ .

$$\therefore \frac{1}{3} < \frac{5}{6}$$

**Example:** Complete the following by putting in  $<$ ,  $>$  or  $=$ .

a.  $\frac{1}{4} \square \frac{3}{8}$

**Solution:** Take  $\frac{1}{4}$  and write as a fraction in eights.

$$\frac{1}{4} = \frac{2}{8}$$

Therefore  $\frac{2}{8} < \frac{3}{8}$

Solution:

$$\frac{3}{2} = \frac{9}{6}$$

(x3)

b.  $\frac{8}{9} \square \frac{3}{2}$

Therefore

$\frac{8}{9} > \frac{9}{6}$

Answer:

$\frac{9}{8} > \frac{3}{2}$

c.

$\frac{2}{5} \square \frac{3}{8}$

Solution:

The lowest common denominator is 24. So change each into a fraction over 24.

$$\frac{3}{2} = \frac{36}{24}$$

(x8)

$\frac{16}{15} > \frac{24}{24}$

Answer:

$\frac{3}{2} > \frac{8}{5}$

d.

$$\frac{5}{2} \square \frac{4}{3}$$

(x4)

$\frac{8}{15} < \frac{20}{20}$

Answer:

$\frac{5}{2} < \frac{4}{3}$

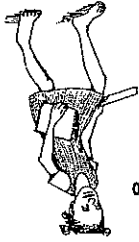
Convert both fractions to a common denominator

$$\frac{8}{5} = \frac{32}{24}$$

(x3)

$$\frac{4}{3} = \frac{16}{15}$$

(x5)



b.

$\frac{9}{8} \square \frac{2}{3}$

## Exercise 2.6

1. Find the smaller fraction in each pair by converting them to a common denominator:

a.  $\frac{3}{10}, \frac{2}{5}$

b.  $\frac{3}{4}, \frac{7}{12}$

c.  $\frac{2}{5}, \frac{3}{10}$

d.  $\frac{4}{9}, \frac{2}{3}$

e.  $\frac{1}{2}, \frac{5}{6}$

f.  $\frac{3}{50}, \frac{2}{25}$

2. Use the symbols  $<$ ,  $>$ ,  $=$  to complete the statements:

a.  $\frac{2}{5} \square \frac{7}{10}$

b.  $\frac{2}{3} \square \frac{3}{6}$

c.  $\frac{1}{2} \square \frac{4}{8}$

d.  $\frac{3}{7} \square \frac{7}{21}$

e.  $\frac{3}{2} \square \frac{8}{6}$

f.  $\frac{1}{3} \square \frac{2}{9}$

g.  $\frac{3}{6} \square \frac{6}{12}$

h.  $\frac{14}{100} \square \frac{9}{50}$

i.  $\frac{3}{20} \square \frac{15}{100}$

3. Compare and write in a  $>$  or  $<$  sign between the fractions:

a.  $\frac{1}{3} \square \frac{1}{4}$

b.  $\frac{1}{4} \square \frac{1}{5}$

c.  $\frac{1}{3} \square \frac{1}{2}$

d.  $\frac{1}{5} \square \frac{1}{6}$

e.  $\frac{1}{7} \square \frac{1}{3}$

f.  $\frac{1}{7} \square \frac{1}{4}$

g.  $\frac{1}{5} \square \frac{1}{7}$

h.  $\frac{1}{8} \square \frac{1}{5}$

4. Compare the following fractions by writing in a  $<$  or  $>$  sign:

a.  $\frac{1}{2} \square \frac{2}{3}$

b.  $\frac{2}{3} \square \frac{1}{4}$

c.  $\frac{2}{5} \square \frac{1}{4}$

d.  $\frac{2}{7} \square \frac{1}{3}$

e.  $\frac{4}{5} \square \frac{5}{6}$

f.  $\frac{3}{4} \square \frac{4}{5}$

g.  $\frac{3}{4} \square \frac{4}{7}$

h.  $\frac{3}{5} \square \frac{5}{7}$

g.  $\frac{3}{8} \square \frac{2}{5}$

j.  $\frac{3}{5} \square \frac{5}{8}$

k.  $\frac{5}{9} \square \frac{4}{5}$

l.  $\frac{7}{10} \square \frac{2}{3}$

m.  $\frac{5}{6} \square \frac{3}{7}$

n.  $\frac{3}{5} \square \frac{4}{9}$

o.  $\frac{3}{10} \square \frac{2}{3}$

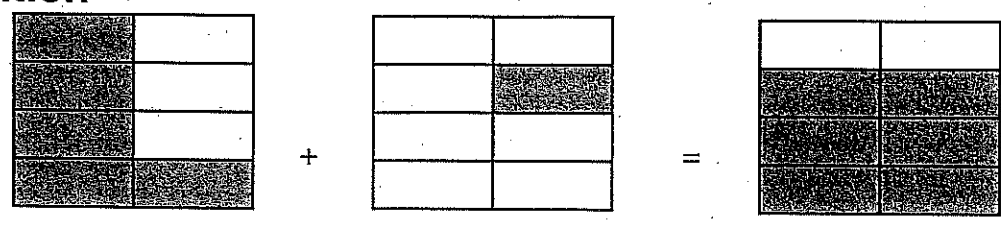
p.  $\frac{3}{4} \square \frac{8}{11}$



5. John sharpened  $\frac{7}{12}$  of his pencils. Bill sharpened  $\frac{11}{12}$  of his. Who sharpened more pencils?
6. Mary ate  $\frac{3}{5}$  of her lunch. Molly ate  $\frac{5}{2}$ . Who ate more of her lunch?
7.  $\frac{1}{2}$  of the chickens are black,  $\frac{1}{4}$  are white. Are there more black or more white chickens?
8. Jack lives  $\frac{3}{4}$  km from school. Peter lives  $\frac{7}{8}$  km from school. Who lives closer to school?
9. Lucy used  $\frac{3}{2}$  cup of flour to make a cake and Billy's recipe called for  $\frac{1}{2}$  cup. Who needs less flour?
10. Mary rode her bicycle  $\frac{4}{3}$  km, Heather rode her bicycle  $\frac{3}{2}$  km. Which girl rode the shorter distance?
11. Fred's team won  $\frac{7}{8}$  of its games and Harry's won  $\frac{12}{7}$ . Which team won more games?
12. Joe practised the violin for  $\frac{5}{8}$  hour each day and Allison practised for  $\frac{3}{2}$  hour. Who practised longer?
13. Max ate  $\frac{5}{3}$  kg chocolate during a week and Alan ate  $\frac{9}{5}$  kg. Who ate more?
14. Helen exercised  $\frac{9}{10}$  hour a day and Sally  $\frac{2}{3}$  hour. Who exercised less each day?

## Adding and Subtracting fractions with the same denominator

### Addition

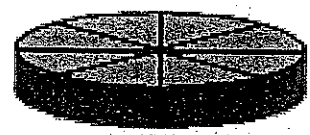


$$\frac{5}{8} \text{ shaded} + \frac{1}{8} \text{ shaded} = \frac{6}{8} \text{ shaded}$$

But  $\frac{6}{8} = \frac{3}{4}$

so  $\frac{3}{4}$  is shaded altogether.

Mother made a pie and cut it into eight equal pieces. Father took two pieces and Joe took three pieces. How much was taken altogether?



$$\frac{3}{8}$$



$$\frac{2}{8}$$

Solution:

$$\frac{2}{8} + \frac{3}{8} = \frac{5}{8}$$

We add the numerators with fractions with the same denominator.



To add fractions with the same denominator, we add the numerators.

**Examples:**

Find the answer to each of the following:

a.  $\frac{3}{7} + \frac{7}{2}$

Solution:

$$\frac{3}{2} + \frac{7}{2} = \frac{3+7}{2}$$

Add top lines together.  
Leave bottom lines the same.



Therefore:

Answer =  $\frac{7}{5}$

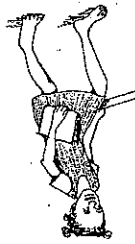
$$\frac{4}{3} + \frac{5}{5}$$

b.

Solution:

$$\frac{4}{3} + \frac{5}{5} = \frac{4+5}{3}$$

Change it into a mixed number.



Therefore:

Answer =  $1\frac{1}{3}$

$$\frac{8}{3} + \frac{8}{1}$$

c.

Solution:

$$\frac{8}{3} + \frac{8}{1} = \frac{8}{3+1}$$

Cancel by 4



Therefore:

Answer =  $2\frac{1}{4}$

When adding mixed numbers:

1. Change to improper fractions.
2. Add the improper fractions.
3. Change answer to mixed number.

**Examples:** Find the answer to each of the following:

a.  $1\frac{3}{4} + \frac{3}{4}$

Solution: First we change  $1\frac{3}{4}$  to an improper fraction.

$$1\frac{3}{4} = \frac{7}{4}$$

Then we add  $\frac{7}{4}$  and  $\frac{3}{4}$

$$\frac{7}{4} + \frac{3}{4} = \frac{10}{4}$$

Then we change  $\frac{10}{4}$  into a mixed number.

$$\begin{aligned} \frac{10}{4} &= 2\frac{2}{4} \\ &= 2\frac{1}{2} \end{aligned}$$

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

Cancel by 2



b.  $2\frac{2}{5} + 1\frac{1}{5}$

Solution:

$$= \frac{12}{5} + \frac{6}{5}$$

$$= \frac{18}{5}$$

$$= 3\frac{3}{5}$$

Answer

$$= 3\frac{3}{5}$$

Changing to improper fractions  
Adding  
Changing to a mixed number



Exercis

- Find e
- a.  $\frac{2}{3}$
  - e.  $\frac{5}{8}$
  - i.  $\frac{1}{13}$
  - m.  $\frac{1}{12}$
  - p.  $\frac{7}{11}$
  - s.  $\frac{10}{15}$
  - v.  $\frac{9}{14}$
- 2 Find e
- a.  $\frac{2}{3}$
  - e.  $\frac{3}{8}$
  - a.  $\frac{2}{5}$
  - e.  $\frac{2}{5}$
  - i.  $\frac{1}{2}$
  - m.  $\frac{3}{5}$
  - q.  $\frac{3}{5}$
  - u.  $\frac{3}{4}$
  - x.  $\frac{5}{8}$

### Exercise 2.7

Find each sum and express as a mixed number:

- a.  $\frac{3}{2} + \frac{3}{2}$       b.  $\frac{5}{4} + \frac{5}{5}$       c.  $\frac{7}{4} + \frac{7}{7}$       g.  $\frac{9}{9} + \frac{10}{6}$       h.  $\frac{7}{7} + \frac{11}{6}$       i.  $\frac{10}{10} + \frac{13}{7}$       j.  $\frac{5}{12} + \frac{11}{12}$       k.  $\frac{3}{5} + \frac{5}{4} + \frac{5}{2}$       l.  $\frac{5}{5} + \frac{4}{4} + \frac{7}{3}$       m.  $\frac{11}{11} + \frac{12}{12} + \frac{12}{7}$       n.  $\frac{6}{6} + \frac{8}{7} + \frac{8}{5}$       o.  $\frac{9}{9} + \frac{7}{7} + \frac{10}{5}$       p.  $\frac{7}{7} + \frac{8}{8} + \frac{11}{9}$       q.  $\frac{7}{7} + \frac{4}{4} + \frac{15}{8}$       r.  $\frac{11}{11} + \frac{14}{14} + \frac{17}{15}$       s.  $\frac{10}{10} + \frac{11}{11} + \frac{19}{15}$       t.  $\frac{7}{7} + \frac{9}{9} + \frac{13}{11}$       u.  $\frac{20}{20} + \frac{20}{9} + \frac{20}{11}$       v.  $\frac{9}{9} + \frac{14}{11} + \frac{14}{13}$       w.  $\frac{4}{25} + \frac{21}{25} + \frac{25}{8}$       x.  $\frac{17}{17} + \frac{5}{5} + \frac{30}{30}$

Find each sum and write as a mixed number.

- a.  $\frac{2}{2} + \frac{3}{4}$       b.  $\frac{5}{4} + \frac{1}{5}$       c.  $\frac{2}{2} + \frac{1}{2}$       d.  $\frac{2}{3} + \frac{5}{4}$       e.  $\frac{3}{3} + \frac{8}{9}$       f.  $\frac{3}{5} + \frac{1}{6}$       g.  $\frac{2}{3} + \frac{5}{3}$       h.  $\frac{4}{3} + \frac{4}{3}$       i.  $\frac{1}{2} + \frac{2}{2}$       j.  $\frac{1}{2} + \frac{2}{1}$       k.  $\frac{2}{3} + \frac{4}{3}$       l.  $\frac{4}{2} + \frac{1}{4}$       m.  $\frac{3}{5} + \frac{1}{3}$       n.  $\frac{1}{6} + \frac{4}{5}$       o.  $\frac{2}{7} + \frac{3}{1}$       p.  $\frac{3}{5} + \frac{2}{3}$       q.  $3 + \frac{2}{5}$       r.  $\frac{4}{3} + \frac{1}{4}$       s.  $\frac{2}{5} + 3$       t.  $\frac{1}{5} + \frac{1}{3}$       u.  $\frac{4}{3} + \frac{4}{3}$       v.  $\frac{3}{1} + \frac{7}{3} + \frac{7}{5}$       w.  $\frac{1}{5} + \frac{1}{3}$       x.  $\frac{8}{5} + \frac{3}{8}$       b.  $\frac{3}{4} + \frac{4}{7}$       c.  $\frac{1}{1} + \frac{2}{6}$       g.  $\frac{5}{5} + \frac{4}{6}$       h.  $\frac{6}{5} + \frac{1}{6}$       i.  $\frac{3}{10} + \frac{4}{10}$       f.  $\frac{8}{10} + \frac{8}{10}$       e.  $\frac{2}{5} + \frac{1}{3}$       g.  $\frac{3}{4} + \frac{7}{7}$       c.  $\frac{3}{4} + \frac{1}{3}$       d.  $\frac{2}{3} + \frac{4}{3}$       e.  $\frac{2}{5} + \frac{1}{6}$       f.  $\frac{2}{6} + \frac{1}{6}$       i.  $\frac{1}{2} + \frac{1}{3}$       k.  $\frac{2}{3} + \frac{4}{3}$       l.  $\frac{4}{2} + \frac{1}{4}$       m.  $\frac{3}{5} + \frac{1}{7}$       n.  $\frac{1}{6} + \frac{4}{5}$       o.  $\frac{2}{7} + \frac{3}{1}$       p.  $\frac{3}{1} + \frac{2}{3}$       q.  $3 + \frac{2}{5}$       r.  $\frac{4}{3} + \frac{1}{4}$       s.  $\frac{2}{5} + 3$       t.  $\frac{1}{5} + \frac{1}{3}$       u.  $\frac{4}{3} + \frac{4}{3}$       v.  $\frac{3}{1} + \frac{7}{3} + \frac{7}{5}$       w.  $\frac{1}{5} + \frac{1}{3}$       x.  $\frac{8}{5} + \frac{3}{8}$

- 
4. John spent  $\frac{3}{8}$  of his pocket money on milk shakes and  $\frac{1}{8}$  on chocolate. What part of his pocket money has he spent?
  5. Sue ran  $\frac{2}{5}$  km to Jo's and another  $\frac{2}{5}$  km to school. How far did she go?
  6. Max and Alan went blackberrying. Max collected  $\frac{3}{4}$  kg and Alan  $1\frac{1}{4}$  kg. What was the total weight of the blackberries?
  7. Sally was put on a strict diet. The first week she lost 2kg, the second week  $2\frac{2}{3}$  kg and the third week  $1\frac{2}{3}$  kg. What was the total weight loss?
  8. Copy the answer grid at the bottom of the next page into your book.

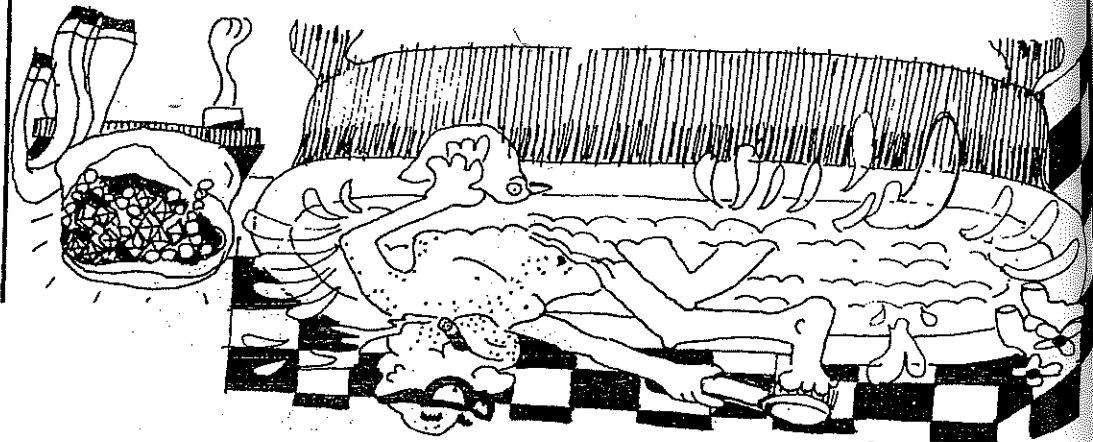


Answer with

- (N)
- (E)
- (M)
- (H)
- (L)
- (A)
- (W)
- (T)
- (A)

$\frac{2}{5}$	$1\frac{10}{15}$
$\frac{4}{12}$	7

### Why did the thief take a bath?



Answer the questions below and exchange the letter in each question with the correct answer in the puzzle below.

(N)  $\frac{1}{2} + \frac{4}{2} =$

(E)  $\frac{4}{2} + \frac{7}{2} =$

(M)  $\frac{7}{12} + \frac{20}{20} =$

(H)  $\frac{4}{3} + \frac{5}{5} =$

(L)  $\frac{5}{6} + \frac{7}{6} =$

(A)  $\frac{6}{5} + \frac{6}{2} =$

(W)  $5\frac{1}{8} + 4\frac{8}{6} =$

(T)  $4\frac{3}{6} + 5\frac{6}{5} =$

(A)  $\frac{10}{9} + 4\frac{10}{7} =$

(A)  $\frac{2}{3} + \frac{7}{3} =$

(T)  $\frac{2}{3} + \frac{11}{3} =$

(K)  $\frac{8}{3} + \frac{17}{17} =$

(E)  $\frac{3}{4} + \frac{4}{4} =$

(N)  $\frac{9}{8} + \frac{11}{8} =$

(E)  $\frac{13}{15} + \frac{15}{15} =$

(C)  $2\frac{3}{4} + 4\frac{4}{1} =$

(A)  $1\frac{12}{5} + 2\frac{12}{11} =$

(T)  $7\frac{14}{9} + 6\frac{14}{5} =$

(E)  $\frac{6}{3} + \frac{11}{3} =$

(G)  $\frac{10}{5} + \frac{17}{5} =$

(W)  $\frac{4}{5} + \frac{20}{20} =$

(E)  $\frac{3}{2} + \frac{4}{2} =$

(A)  $\frac{17}{16} + \frac{20}{20} =$

(D)  $2\frac{5}{3} + 3\frac{5}{1} =$

(Y)  $5\frac{7}{4} + 2\frac{7}{2} =$

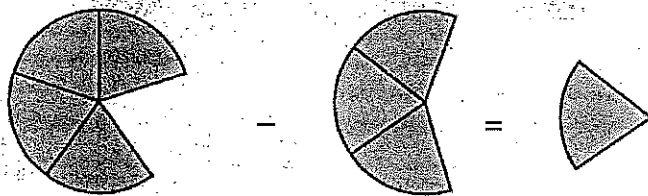
(O)  $3\frac{15}{9} + 7\frac{15}{14} =$

(A)  $5\frac{11}{7} + 4\frac{11}{6} =$

10	15	10	7
11	13	11	14
17	20	17	17
11	19	11	11
15	8	15	7
5	11	5	5
11	10	11	11
6	2	6	1
5	4	5	15
9	11	9	17
14	14	14	4
11	6	11	5
16	11	16	10
1	6	1	6
14	9	14	7
15	20	15	14
7	15	7	7

## Subtraction

$\frac{4}{5}$  of a cake is left on a plate. Bill took  $\frac{3}{5}$ . How much is left?



$$\frac{4}{5} \quad \text{take away} \quad \frac{3}{5} \quad = \quad \frac{1}{5}$$

$$\frac{4}{5} \quad - \quad \frac{3}{5} \quad = \quad \frac{1}{5}$$

To subtract fractions with the same denominator,  
subtract the numerator.

**Examples:** Find the answer to each of the following.

a.  $\frac{4}{5} - \frac{2}{5}$

Solution:  $\frac{4}{5} - \frac{2}{5} = \frac{4-2}{5}$

SUBTRACT THE TOP LINES  
KEEP THE BOTTOM LINE THE SAME

$$= \frac{2}{5}$$

Answer =  $\frac{2}{5}$

b.  $\frac{7}{12} - \frac{5}{12}$

Solution:  $\frac{7}{12} - \frac{5}{12} = \frac{7-5}{12}$

$$= \frac{2}{12}$$

Cancel by 2

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

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





- When subtracting mixed numbers:
1. Change to improper fractions.
  2. Subtract the improper fractions.
  3. Change answer to a mixed number.

**Examples:**

Find the answer to each of the following:

a.  $3\frac{2}{4} - \frac{5}{5}$

Solution:

$$3\frac{2}{4} = \frac{17}{4}$$

Then we subtract

$$\frac{17}{4} - \frac{5}{5} = \frac{17-4}{5}$$

$$= \frac{13}{5}$$

Then we change the answer into a mixed number.

$$\frac{13}{5} = 2\frac{3}{5}$$

Answer:  $= 2\frac{3}{5}$

b.

$$2\frac{2}{3} - \frac{7}{6}$$

$$2\frac{2}{3} = \frac{14}{6}$$

$$\frac{14}{6} - \frac{7}{6} = \frac{7}{6}$$

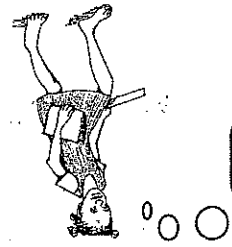
$$= \frac{11}{7}$$

$$= 1\frac{4}{7}$$

Answer:  $= 1\frac{4}{7}$

Solution:

Changing to an improper fraction



Solution:

$$c. \quad 3\frac{3}{8} - 1\frac{5}{8}$$

$$3\frac{3}{8} - 1\frac{5}{8}$$

$$= \frac{27}{8} - \frac{13}{8}$$

$$= \frac{\cancel{14}^7}{\cancel{8}_4}$$

$$= \frac{7}{4}$$

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

Cancel by 2



### Exercise 2.8

1. a.  $\frac{3}{5} - \frac{1}{5}$

e.  $\frac{7}{9} - \frac{3}{9}$

i.  $\frac{9}{11} - \frac{5}{11}$

m.  $\frac{18}{30} - \frac{15}{30}$

q.  $\frac{18}{19} - \frac{12}{19}$

u.  $\frac{15}{39} - \frac{12}{39}$

b.  $\frac{3}{4} - \frac{1}{4}$

f.  $\frac{7}{10} - \frac{6}{10}$

j.  $\frac{7}{15} - \frac{4}{15}$

n.  $\frac{17}{25} - \frac{13}{25}$

r.  $\frac{15}{21} - \frac{13}{21}$

v.  $\frac{20}{27} - \frac{13}{27}$

c.  $\frac{7}{8} - \frac{3}{8}$

g.  $\frac{12}{13} - \frac{5}{13}$

k.  $\frac{19}{20} - \frac{14}{20}$

o.  $\frac{15}{16} - \frac{4}{16}$

s.  $\frac{29}{30} - \frac{11}{30}$

w.  $\frac{14}{31} - \frac{6}{31}$

d.  $\frac{3}{7} - \frac{2}{7}$

h.  $\frac{10}{12} - \frac{8}{12}$

l.  $\frac{17}{19} - \frac{4}{19}$

p.  $\frac{11}{14} - \frac{3}{14}$

t.  $\frac{19}{26} - \frac{5}{26}$

x.  $\frac{15}{33} - \frac{11}{33}$

3 The total weight of two soil samples is  $10\frac{4}{5}$  g. If one sample weighs

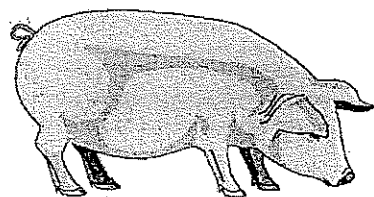
$7\frac{1}{4}$  g, what is the weight of the other sample?

4 Nova's dog weighed  $31\frac{5}{8}$  kg before he lost weight. Now he is  $29\frac{3}{8}$  kg. What was the weight loss?

a.	$3\frac{2}{5} - 5\frac{1}{4}$	b.	$2\frac{4}{9} - \frac{9}{7}$	c.	$2\frac{1}{4} - \frac{4}{3}$
d.	$3\frac{1}{6} - 6\frac{1}{5}$	e.	$3\frac{4}{7} - \frac{7}{5}$	f.	$3\frac{1}{4} - \frac{4}{3}$
g.	$4\frac{3}{8} - \frac{8}{5}$	h.	$2\frac{7}{10} - \frac{10}{9}$	i.	$3\frac{11}{2} - \frac{11}{7}$
j.	$4\frac{5}{7} - \frac{7}{6}$	k.	$6\frac{1}{3} - \frac{3}{2}$	l.	$9\frac{2}{5} - \frac{4}{5}$
m.	$4\frac{1}{2} - 2\frac{1}{2}$	n.	$6\frac{2}{3} - 4\frac{1}{3}$	o.	$3\frac{4}{3} - 1\frac{1}{4}$
p.	$4\frac{4}{5} - 3\frac{3}{5}$	q.	$4\frac{6}{7} - 2\frac{2}{3}$	r.	$5\frac{5}{5} - 1\frac{6}{1}$
s.	$3\frac{2}{9} - 1\frac{7}{9}$	t.	$3\frac{3}{8} - 1\frac{5}{8}$	u.	$4\frac{1}{8} - 1\frac{5}{8}$
v.	$6\frac{1}{4} - 4\frac{3}{4}$	w.	$5\frac{11}{7} - 1\frac{2}{2}$	x.	$4\frac{10}{9} - 2\frac{7}{10}$

5. Copy the answer grid at the top into your book.

**What did the pig say when the man grabbed him by the tail?**



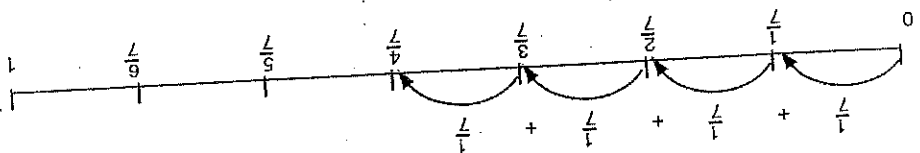
$7\frac{3}{8}$	$1\frac{3}{4}$	$\frac{1}{4}$	$\frac{3}{17}$	$1\frac{5}{7}$	$\frac{1}{2}$
$1\frac{1}{5}$	$\frac{5}{7}$	$\frac{1}{6}$	$2\frac{7}{10}$	$\frac{3}{20}$	$5\frac{3}{20}$
	$\frac{3}{4}$	$5\frac{4}{5}$	$1\frac{2}{3}$	$2\frac{2}{5}$	

**Directions:** Answer the questions below then transfer the letter from each question to the box above with the correct answer.

<b>I</b> $\frac{7}{8} - \frac{5}{8} =$	<b>S</b> $\frac{15}{17} - \frac{12}{17} =$
<b>N</b> $\frac{11}{20} - \frac{8}{20} =$	<b>E</b> $\frac{7}{12} - \frac{5}{12} =$
<b>S</b> $1\frac{1}{4} - \frac{3}{4} =$	<b>T</b> $1\frac{4}{5} - \frac{3}{5} =$
<b>H</b> $1\frac{1}{7} - \frac{3}{7} =$	<b>O</b> $1\frac{8}{20} - \frac{13}{20} =$
<b>E</b> $3\frac{3}{5} - 1\frac{1}{5} =$	<b>H</b> $8\frac{1}{4} - 6\frac{2}{4} =$
<b>T</b> $10 - 2\frac{5}{8} =$	<b>M</b> $4\frac{2}{9} - 2\frac{5}{9} =$
<b>F</b> $12\frac{7}{10} - 6\frac{9}{10} =$	<b>I</b> $5 - 3\frac{2}{7} =$
<b>E</b> $5\frac{7}{20} - 2\frac{13}{20} =$	<b>D</b> $9\frac{1}{20} - 3\frac{18}{20} =$

Multiplication of a fraction and a whole number

Study this number line.



This number line shows  $\frac{1}{7} + \frac{1}{7} + \frac{1}{7} + \frac{1}{7} = \frac{4}{7}$

This is 4 lots of  $\frac{1}{7}$  which can be written  $4 \times \frac{1}{7}$ .

So,  $4 \times \frac{1}{7} = \frac{4}{7}$

This can be done by multiplying.

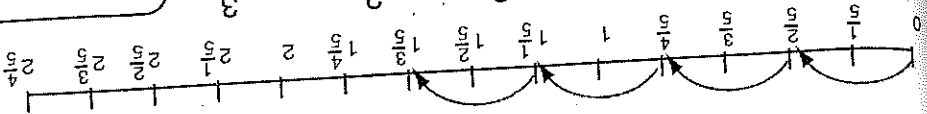
First write 4 as a fraction, i.e.  $4 = \frac{4}{1}$

Multiply  $\frac{4}{1}$  by  $\frac{1}{7}$

To multiply fractions we multiply the numerator and we multiply the denominator

$$\frac{4}{1} \times \frac{1}{7} = \frac{4 \times 1}{1 \times 7} = \frac{4}{7}$$

Study this number line.



$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1$$

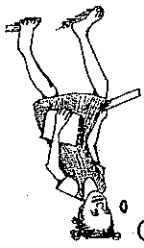
This means 4 lots of  $\frac{1}{4}$

By multiplication:  $\frac{1}{4} \times \frac{4}{1} = \frac{1 \times 4}{4 \times 1} = \frac{4}{4} = 1$

$$= \frac{1}{3}$$

$$= \frac{5}{8}$$

Change to a mixed number



**Examples** Do the following multiplication and write your answer as a mixed number.

a.  $7 \times \frac{1}{2}$

Solution:

$$7 \times \frac{1}{2} = \frac{7}{1} \times \frac{1}{2}$$

Write 7 as  $\frac{7}{1}$

$$= \frac{7 \times 1}{1 \times 2}$$

multiply numerator

multiply denominator

$$= \frac{7}{2}$$

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

as a mixed number



b.  $10 \times \frac{1}{4}$

Solution:

$$10 \times \frac{1}{4} = \frac{10}{1} \times \frac{1}{4}$$

$$= \frac{10 \times 1}{1 \times 4}$$

$$= \frac{10}{4}$$

cancel by 2

$$= \frac{5}{2}$$

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

as a mixed number



Answer

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

c.  $6 \times \frac{2}{5}$

Solution:

$$6 \times \frac{2}{5} = \frac{6}{1} \times \frac{2}{5}$$

$$= \frac{6 \times 2}{1 \times 5}$$

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

$$= 2\frac{2}{5}$$

Answer

$$= 2\frac{2}{5}$$

The word 'of' means multiply.

Thus  $\frac{1}{2}$  of 10 =  $\frac{1}{2} \times 10$

$\frac{1}{2} \times 10$

$\frac{1}{2}$  of 10 means  $\frac{1}{2}$  of a group of 10 and is written as

$$\frac{1}{2} \times 10 = \frac{1}{2} \times \frac{10}{1}$$

writing 10 as  $\frac{10}{1}$

$$= \frac{1}{2} \times \frac{10}{1}$$

cancel by 2

$$= \frac{1}{\cancel{2}} \times \frac{\cancel{10}}{1}$$

$$= \frac{1}{1} \times \frac{5}{1}$$

$$= 5$$

**Finding a Fraction of an Amount**

d.  $14 \times \frac{4}{3}$

Solution

$14 \times \frac{4}{3} = \frac{14}{1} \times \frac{4}{3}$

cancel by 2

$$= \frac{\cancel{14}^7}{1} \times \frac{4}{\cancel{3}_2}$$

$$= \frac{7 \times 4}{1 \times 2}$$

$$= \frac{28}{2}$$

$$= 14$$

Answer =  $14$

**Examples:** Find

a.  $\frac{1}{4}$  of 8

Solution  $\frac{1}{4}$  of 8 =  $\frac{1}{4} \times 8$   
=  $\frac{1}{4} \times \frac{8}{1}$   
=  $\frac{8}{4}$   
= 2  
Answer = 2

a.  $\frac{3}{4}$  of 9

Solution  $\frac{3}{4}$  of 9 =  $\frac{3}{4} \times 9$   
=  $\frac{3}{4} \times \frac{9}{1}$   
=  $\frac{27}{4}$   
=  $6\frac{3}{4}$   
Answer =  $6\frac{3}{4}$

**Exercise 2.9**

1. Multiply giving your answer as a mixed number:

a.  $3 \times \frac{1}{2}$

b.  $4 \times \frac{1}{3}$

c.  $5 \times \frac{1}{4}$

d.  $5 \times \frac{1}{2}$

e.  $7 \times \frac{1}{3}$

f.  $8 \times \frac{1}{5}$

g.  $9 \times \frac{1}{2}$

h.  $10 \times \frac{1}{3}$

i.  $7 \times \frac{1}{4}$

j.  $9 \times \frac{1}{4}$

k.  $11 \times \frac{1}{3}$

l.  $12 \times \frac{1}{4}$

m.  $13 \times \frac{1}{2}$

n.  $14 \times \frac{1}{3}$

o.  $15 \times \frac{1}{4}$

p.  $17 \times \frac{1}{3}$

q.  $19 \times \frac{1}{6}$

r.  $21 \times \frac{1}{5}$

s.  $25 \times \frac{1}{7}$

t.  $29 \times \frac{1}{9}$

u.  $32 \times \frac{1}{5}$

v.  $37 \times \frac{1}{7}$

w.  $39 \times \frac{1}{4}$

x.  $42 \times \frac{1}{5}$



Find:

- a.  $\frac{4}{1}$  of 16
- b.  $\frac{3}{1}$  of 15
- c.  $\frac{10}{1}$  of 40
- d.  $\frac{1}{9}$  of 36
- e.  $\frac{1}{5}$  of 25
- f.  $\frac{1}{6}$  of 24
- g.  $\frac{3}{1}$  of 36
- h.  $\frac{1}{7}$  of 35
- i.  $\frac{1}{4}$  of 5
- j.  $\frac{1}{5}$  of 7
- k.  $\frac{1}{9}$  of 11
- l.  $\frac{1}{8}$  of 9
- m.  $\frac{1}{6}$  of 13
- n.  $\frac{1}{4}$  of 17
- o.  $\frac{1}{10}$  of 33
- p.  $\frac{1}{7}$  of 50
- q.  $\frac{1}{8}$  of 33
- r.  $\frac{1}{9}$  of 47
- s.  $\frac{1}{5}$  of 46
- t.  $\frac{1}{6}$  of 55
- u.  $\frac{1}{11}$  of 100
- v.  $\frac{1}{10}$  of 87
- w.  $\frac{1}{12}$  of 97
- x.  $\frac{1}{11}$  of 112

Multiply giving your answer as a mixed number:

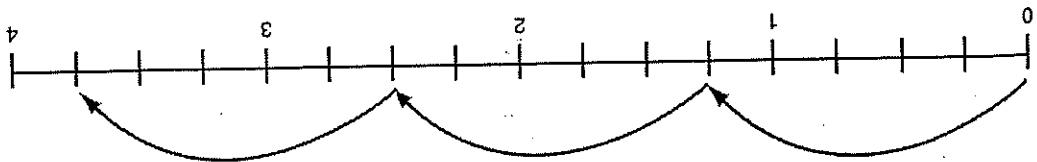
- a.  $4 \times \frac{3}{2} = \square$
- b.  $3 \times \frac{4}{3} = \square$
- c.  $3 \times \frac{7}{3} = \square$
- d.  $5 \times \frac{3}{2} = \square$
- e.  $4 \times \frac{5}{8} = \square$
- f.  $6 \times \frac{5}{4} = \square$
- g.  $6 \times \frac{3}{2} = \square$
- h.  $12 \times \frac{4}{3} = \square$
- i.  $10 \times \frac{5}{4} = \square$
- j.  $5 \times \frac{7}{2} = \square$
- k.  $9 \times \frac{3}{2} = \square$
- l.  $7 \times \frac{5}{3} = \square$
- m.  $8 \times \frac{6}{5} = \square$
- n.  $4 \times \frac{10}{7} = \square$
- o.  $5 \times \frac{7}{4} = \square$
- p.  $6 \times \frac{9}{5} = \square$
- q.  $4 \times \frac{11}{5} = \square$
- r.  $5 \times \frac{13}{4} = \square$
- s.  $7 \times \frac{10}{7} = \square$
- t.  $9 \times \frac{7}{5} = \square$
- u.  $12 \times \frac{5}{4} = \square$
- v.  $11 \times \frac{8}{7} = \square$
- w.  $11 \times \frac{6}{7} = \square$
- x.  $10 \times \frac{11}{10} = \square$

**Exercise 2.9 (continued)**

4. John has 150 toy cars.  $\frac{3}{5}$  of them are yellow. How many of them are yellow?
5. In a class of 28 students,  $\frac{3}{7}$  are boys. How many boys are in the class?
6. I bought 3 packets of chocolates each weighing  $\frac{3}{4}$  kg. What was the total weight of the chocolate?
7. A bus will hold 60 passengers. How many people are there on the bus if it is  $\frac{4}{5}$  full?
8. It rains on  $\frac{3}{5}$  of the days in June. On how many days does it rain?
9. The cook has 3 dozen eggs.  $\frac{3}{4}$  of them are used for breakfast. How many eggs are left? (Remember 1 dozen = 12.)
10. A box contains 35 lollies.
  - a. How many lollies did Mina eat if she ate  $\frac{2}{7}$  of the lollies?
  - b. Joe ate  $\frac{1}{5}$  of the lollies. How many did he eat?
  - c. How many lollies were left?

# Multiplying a whole number by a mixed number

Consider  $3 \times 1\frac{1}{4}$ . We can show this on a number line:



By multiplication, we first of all write 3 as a fraction  $\frac{3}{1}$ .

Then we write  $1\frac{1}{4}$  as an improper fraction  $\frac{5}{4}$ .

Multiply  $\frac{3}{1}$  by  $\frac{5}{4}$ .

$$\frac{3}{1} \times \frac{5}{4} = \frac{15}{4}$$

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

## Examples

Find:

a.  $4 \times 1\frac{1}{2}$

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

Solution

$$\begin{aligned} &= 4 \times \frac{3}{2} \\ &= \frac{4 \times 3}{2} \\ &= \frac{12}{2} \\ &= 6 \end{aligned}$$

Answer = 6

4 as a fraction

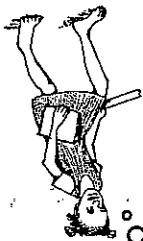
$$4 \times \frac{1}{2}$$

$1\frac{1}{2}$  as an improper fraction

cancel by 2



Always change mixed numbers into improper fractions before multiplying



$$b. 5 \times 3\frac{1}{3}$$

$$\text{Solution } 5 \times 3\frac{1}{3} = \frac{5}{1} \times \frac{10}{3}$$

$$= \frac{5 \times 10}{1 \times 3}$$

$$= \frac{50}{3}$$

$$= 16\frac{2}{3}$$

$$\text{Answer} = 16\frac{2}{3}$$

### Exercise 2.10

1. Multiply, giving your answer as a mixed number:

a.  $2 \times 1\frac{1}{3}$

b.  $5 \times 1\frac{1}{2}$

c.  $3 \times 2\frac{1}{2}$

d.  $3 \times 2\frac{1}{4}$

e.  $5 \times 1\frac{3}{5}$

f.  $4 \times 1\frac{5}{6}$

g.  $5 \times 2\frac{2}{3}$

h.  $5 \times 3\frac{1}{4}$

i.  $3 \times 2\frac{1}{7}$

j.  $2 \times 1\frac{7}{9}$

k.  $3 \times 1\frac{3}{8}$

l.  $6 \times 1\frac{2}{5}$

m.  $3 \times 10\frac{2}{3}$

n.  $5 \times 6\frac{1}{5}$

o.  $7 \times 3\frac{1}{2}$

2. A recipe for a cake needs  $\frac{3}{4}$  cup of milk. If I make 3 cakes, how much milk would I need?

3. A beetle is  $2\frac{1}{2}$  cm long. A grasshopper is 5 times as long as a beetle. How long is the grasshopper?

4. I need 3 pieces of string each  $6\frac{1}{2}$  metres long. What is the total length of string that I need?

How much does Mary's dog weigh if it weighs 4 times as much as her cat which weighs  $2\frac{2}{3}$  kg?

Sally's garden is  $5\frac{3}{8}$  metres long. Anne's garden is twice as long as Sally's garden. How long is Anne's garden?

A recipe for making pawpaw jam needs  $1\frac{8}{1}$  kg of sugar for every kg of pawpaw. How much sugar would Leti need if she has 6kg of pawpaw?

Exercise 2.11

Draw a 6 by 2 rectangle and divide it into 12 equal parts. Shade  $\frac{5}{12}$  of the rectangle. What fraction is unshaded?

Nera blew out 6 of the 12 candles on his cake. Write 2 fractions that show what part of the candles he blew out.

Write a fraction for each labelled point on this number line.



Copy and complete these using <, = or >.

- a.  $\frac{1}{4} \square \frac{3}{8}$
- b.  $\frac{3}{2} \square \frac{4}{6}$
- c.  $\frac{10}{7} \square \frac{5}{3}$

A train travels 90km every hour. How far will it travel in  $4\frac{1}{2}$  hours?

Anne bought a jacket worth 3600vt for only  $\frac{3}{4}$  of the cost at a sale. How much did Anne pay for the jacket?

Mrs Sall wants to make three shirts as birthday presents for her

husband. If she needs  $1\frac{1}{4}$  metres for each shirt, how many metres of

material will she have to buy?

8. Add the following giving answers as mixed numbers:

a.  $\frac{2}{3} + 3\frac{2}{3}$

b.  $4\frac{3}{8} + \frac{7}{8}$

c.  $2\frac{5}{12} + 1\frac{11}{12}$

9. Subtract, giving your answers as mixed numbers:

a.  $2\frac{5}{8} - 1\frac{2}{8}$

b.  $3\frac{1}{10} - 1\frac{7}{10}$

10. How many minutes are there in  $1\frac{2}{3}$  hours?

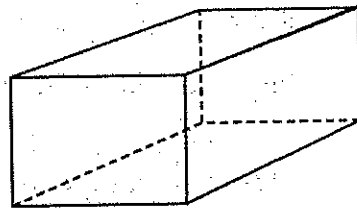
11. In Shanty Town,  $\frac{3}{8}$  of the population of 240 people is under 16 years of age. How many people in Shanty Town are under 16 years?

12. This tank holds 12 litres of liquid when full.  
How many litres are in it if it is:

a.  $\frac{3}{4}$  full

b.  $\frac{5}{12}$  full

c.  $\frac{5}{6}$  full?



# Decimals

A decimal fraction is a different way of writing a fraction which has a denominator of 10 or multiples of 10.

The number 24.13 is written in a place value table as:

Tens	2	Tens	4
Units	.	tenths	1
	.	hundredths	3

decimal point

Each place to the right of the decimal point represents a fractional power of ten.

To write  $\frac{10}{3}$  as a decimal number, we leave out the denominator 10 and put a decimal point on the left hand side of 3.

We put a 0 before the decimal point if there is no whole number

decimal point

$$\frac{10}{3} = 0.3$$

Similarly  $\frac{5}{5}$  as a decimal is:

$$\frac{5}{5} = 0.5$$

## Writing fractions as decimals

When writing fractions with a denominator of 10 as a decimal, there is one number after the decimal point.

One zero here

$$\frac{6}{10} = 0.6$$

One number after the decimal point

Similarly fractions with a denominator of 100 has two numbers after the decimal place.

$$\frac{100}{5} = 0.05$$

$$\frac{100}{16} = 0.16$$

We put 0 before 5 to make two numbers



**Example:** Write each of the following fractions as decimals:

a.  $\frac{26}{100}$

**Solution:** The denominator is 100 so there are two numbers after the decimal point.

$$\frac{26}{100} = 0.26$$

b.  $\frac{15}{1000}$

**Solution:** The denominator is 1000, so there are three numbers after the decimal point.

$$\frac{15}{1000} = 0.015$$

c.  $\frac{23}{10}$

**Solution:** The denominator is 10, so there is one number after the decimal point.

$$\frac{23}{10} = 2\frac{3}{10} = 2.3$$

improper fraction      mixed number

d.  $5\frac{9}{10}$

**Solution:**  $5\frac{9}{10} = 5.9$

5 units

e.  $10\frac{3}{100}$

**Solution:**  $10\frac{3}{100}$  Consists of a whole number 10, and three hundredths

$$10\frac{3}{100} = 10.03$$





## Writing a decimal as a fraction

A decimal with one number after the decimal place is a fraction out of 10. Likewise, a decimal with two numbers after the decimal place is a fraction out of 100. That is, the number of zeros in the denominator of a fraction is the same as the number of numbers after the decimal place.

### Examples

Write each of the following as fractions in their simplest form:

a. 0.4

Solution: 0.4 is 4 tenths

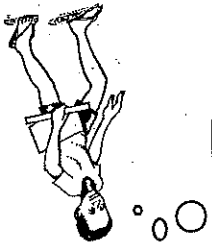
$$= \frac{4}{10}$$

$$= \frac{2}{5}$$

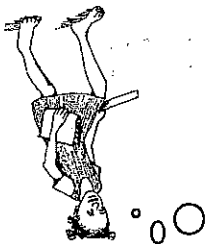
b. 0.17

$$= \frac{17}{100}$$

1 number after the decimal place so it's denominator is 10



2 numbers after the decimal place so a fraction over 100



- a.  $\frac{15}{100}$
- d.  $\frac{13}{100}$
- g.  $\frac{7}{10}$
- i.  $\frac{207}{10}$
- m.  $\frac{71}{1000}$

Express the following as decimals:

- b.  $\frac{3}{10}$
- e.  $\frac{24}{1000}$
- h.  $\frac{14}{100}$
- k.  $\frac{45}{1000}$
- n.  $\frac{4}{100}$

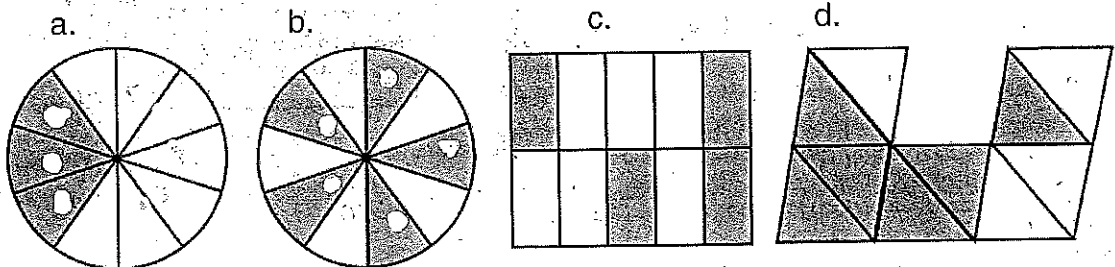
- c.  $\frac{1000}{9}$
- f.  $\frac{10}{12}$
- i.  $\frac{100}{8}$
- l.  $\frac{822}{1000}$
- o.  $\frac{15}{100}$

**Exercise 2.12 (continued)**

2. Express the following as a fraction in its simplest form:

- |          |          |          |
|----------|----------|----------|
| a. 0.6   | b. 0.08  | c. 0.005 |
| d. 0.046 | e. 0.12  | f. 0.015 |
| g. 0.55  | h. 1.04  | i. 3.002 |
| j. 0.5   | k. 0.065 | l. 0.125 |
| m. 6.25  | n. 10.5  | o. 4.375 |
| p. 15.08 | q. 1.025 | r. 4.125 |

3. These shapes are divided into ten equal parts. For each shape, write down the part that is shaded as a fraction and as a decimal.



4. Copy the answer grid into your book.

## When is the time of day like the whistle of a train?

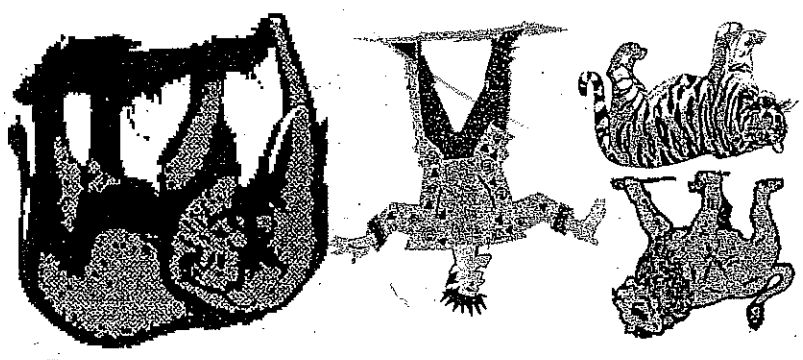
Join each decimal to its equivalent fraction. Each line will pass through a letter and number. These give the code to answer the riddle.

0.1 •								• $\frac{7}{10}$
0.7 •		I		5				• $\frac{3}{1000}$
0.09 •		1				8	H	• $\frac{1}{100}$
0.01 •	O			T				• $\frac{1}{1000}$
0.003 •	2		4			6		• $\frac{9}{100}$
0.001 •	N			W			E	• $\frac{5}{10000}$
0.0005 •			3					• $\frac{1}{10000}$
0.0001 •		S				7		• $\frac{1}{10}$

1	2	3	4	5	6	5	7
6	1	8	6	8	6	1	8

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$	$\frac{1}{11}$	$\frac{1}{12}$	$\frac{1}{13}$	$\frac{1}{14}$	$\frac{1}{15}$	$\frac{1}{16}$	$\frac{1}{17}$	$\frac{1}{18}$	$\frac{1}{19}$	$\frac{1}{20}$	$\frac{1}{21}$	$\frac{1}{22}$	$\frac{1}{23}$	$\frac{1}{24}$	$\frac{1}{25}$
$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$	$\frac{1}{11}$	$\frac{1}{12}$	$\frac{1}{13}$	$\frac{1}{14}$	$\frac{1}{15}$	$\frac{1}{16}$	$\frac{1}{17}$	$\frac{1}{18}$	$\frac{1}{19}$	$\frac{1}{20}$	$\frac{1}{21}$	$\frac{1}{22}$	$\frac{1}{23}$	$\frac{1}{24}$	$\frac{1}{25}$

<b>n</b> 0.52 =	<b>s</b> 0.26 =	<b>e</b> 0.95 =	<b>p</b> 0.6 =	<b>m</b> 0.8 =
<b>g</b> 0.50 =	<b>o</b> 0.75 =	<b>d</b> 0.68 =	<b>u</b> 0.4 =	<b>a</b> 0.25 =
<b>h</b> 0.8125 =	<b>y</b> 0.875 =	<b>f</b> 0.3125 =	<b>r</b> 0.125 =	<b>t</b> 0.3 =



Change the decimals to fractions to find the code to save yourself.

What would you do if you were surrounded by fifteen elephants, twelve tigers and ten lions?

Copy the grid into your book.

## Ordering Decimals

To compare decimals, we follow these steps:

1. Write the number in a column with decimal points in line.
2. Starting from the left, compare the digits until you find one digit larger than the others.
3. The number with the largest digit will be the larger number.

**Example 1** Which is larger?

a. 0.367 or 0.342

Solution:

1. Line up the decimals.

0 . 3 6 7

0 . 3 4 2

2. Compare the tenths

0 . 3 6 7

0 . 3 4 2

↑  
same

3. Compare hundredths

0 . 3 6 7

0 . 3 4 2

↑  
6 > 4

Therefore 0.367 is larger than 0.342

b. 1.209 or 1.134

Solution:

1. 1 . 2 0 9

1 . 1 3 4

2. 1 . 2 0 9

1 . 1 3 4

↑   ↑  
same 2 > 1

Therefore 1.209 is larger than 1.134

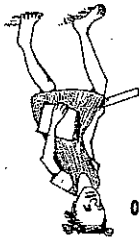
- a.  $4.73 > 3.82$
- c.  $6.303 > 4.313$
- e.  $0.611 < 0.701$
- g.  $0.125 > 0.045$
- i.  $0.47 > 0.5$
- b.  $12.091 > 12.141$
- d.  $0.814 > 0.834$
- f.  $2.94 < 3.04$
- h.  $0.113 < 0.902$
- j.  $0.8 > 0.75$

State whether the following are true or false:

- a.  $4.713, 4.803$
- c.  $16.21, 19.91$
- e.  $0.5, 0.293$
- g.  $7.912, 7.092$
- b.  $12.777, 10.999$
- d.  $0.82, 0.91$
- f.  $12.034, 12.340$
- h.  $0.773, 0.843$

Which is the larger of the pair?

**Exercise 2.13**



Comparing tenths, the smallest is 7. Since there are two 7's, we compare the hundredths. This gives us  $9 > 8$ . Therefore we have 0.78, 0.79, ...  
Doing the same with the rest we get:  
0.78, 0.79, 0.87, 0.89, 0.97.

- 0.97
- 0.78
- 0.87
- 0.89
- 0.79

Solution:

- b. 0.97, 0.78, 0.87, 0.89, 0.79



Comparing tenths, we find the number starting with the smallest as: 4, 6, 7, 8  
Therefore, answer = 0.43, 0.65, 0.79, 0.82.

- 0.65
- 0.82
- 0.79
- 0.43

Solution:

- a. 0.65, 0.82, 0.79, 0.43

**Example 2**

Arrange in order starting with the smallest:

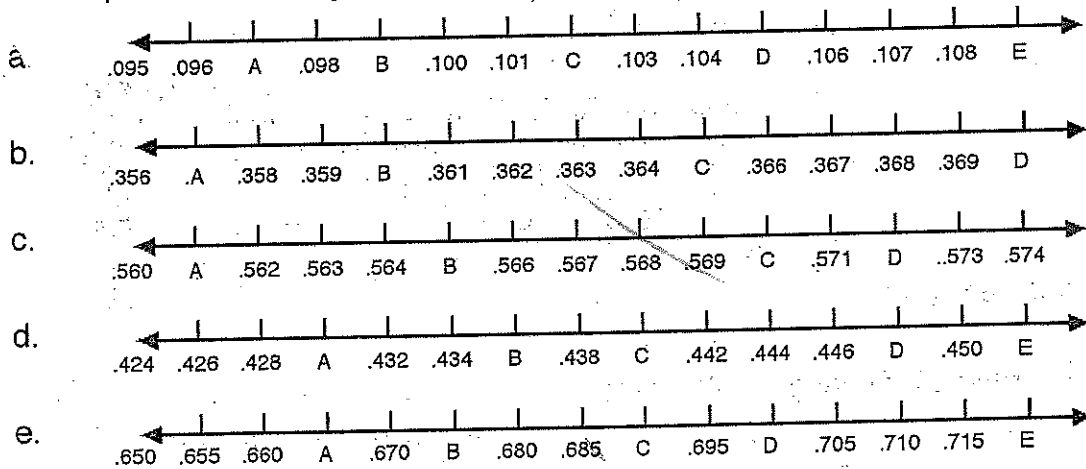
3. Replace the  $\square$  with  $>$ ,  $<$  or  $=$ .

- |                         |                         |                          |
|-------------------------|-------------------------|--------------------------|
| a. 0.64 $\square$ 0.59  | b. 0.50 $\square$ 0.5   | c. 2.05 $\square$ 2.49   |
| d. 0.4 $\square$ 0.004  | e. 0.55 $\square$ 5.5   | f. 0.050 $\square$ 0.50  |
| g. 0.125 $\square$ 0.05 | h. 0.6 $\square$ 0.600  | i. 31.7 $\square$ 3.17   |
| j. 7.0 $\square$ 0.70   | k. 7.05 $\square$ 7.50  | l. 9.302 $\square$ 9.320 |
| m. 0.7 $\square$ 0.009  | n. 0.120 $\square$ 0.30 | o. 3.0 $\square$ 0.30    |
| p. 0.04 $\square$ 0.040 | q. 4.4 $\square$ 44.0   | r. 5 $\square$ 0.5       |
| s. 5 $\square$ 5.0      | t. 15 $\square$ 15.0    |                          |

4. Arrange each group of decimals in order from least to greatest.

- |                               |                              |
|-------------------------------|------------------------------|
| a. 0.4, 0.2, 0.9, 0.7         | b. 0.04, 0.02, 0.09, 0.07    |
| c. 1.9, 26.3, 0.5, 1.08       | d. 0.017, 0.004, 0.02, 0.009 |
| e. 13.05, 4.9, 87.23, 6.7     | f. 0.027, 0.964, 1.23, 0.5   |
| g. 0.971, 0.643, 0.982, 0.907 | h. 10.001, 0.1, 0.001, 1     |

5. For each number line, give the missing decimal number marked by the capital letters.



6. Complete these patterns:

- |    |                      |      |      |     |
|----|----------------------|------|------|-----|
| a. | 0.701, 0.703, 0.705, | ___, | ___, | ___ |
| b. | 0.230, 0.233, 0.236, | ___, | ___, | ___ |
| c. | 0.405, 0.410, 0.415, | ___, | ___, | ___ |
| d. | 0.520, 0.525, 0.530, | ___, | ___, | ___ |
| e. | 0.017, 0.027, 0.037, | ___, | ___, | ___ |
| t. | 0.235, 0.245, 0.255, | ___, | ___, | ___ |
| g. | 4.250, 4.450, 4.650, | ___, | ___, | ___ |
| h. | 5.220, 5.420, 5.620, | ___, | ___, | ___ |

# Adding Decimals

add decimals

1. Write the numbers in columns with decimal points in line.
2. Add (as if there are no decimal points).
3. In your answer, put the decimal place under the others.

## Examples

Add:

a.  $3.471$  and  $1.036$

Solution:

$$\begin{array}{r} 3.471 \\ + 1.036 \\ \hline 4.507 \end{array}$$

decimal places in line

b.  $2.57 + 16.4 + 5$

Solution:

$$\begin{array}{r} 2.57 \\ 16.4 \\ 5 \\ \hline 24.97 \end{array}$$

Since 5 is 5.

Fill in the spaces with 0's

$$\begin{array}{r} 2.57 \\ 16.40 \\ 5.00 \\ \hline 23.97 \end{array}$$



Solution:

$$\begin{array}{r} 1012.510 \\ + 9.200 \\ + 0.045 \\ \hline 1111.755 \end{array}$$

c.  $102.51 + 9.2 + 0.045$

## Subtracting decimals

subtract decimals, do the same as when adding decimals.

## Examples

Subtract:

a.  $12.956 - 8.21$

Solution:

$$\begin{array}{r} 12.956 \\ - 8.21 \\ \hline 4.746 \end{array}$$

fill in 0's

line up decimal places

b.  $2.6 - 1.37$

Solution:

$$\begin{array}{r} 2.6 \\ - 1.37 \\ \hline \end{array} \longrightarrow \begin{array}{r} 2.6^{51}0 \\ - 1.37 \\ \hline 1.23 \end{array}$$

c.  $20 - 11.891$

Solution

$$\begin{array}{r} 20. \\ - 11.891 \\ \hline \end{array} \longrightarrow \begin{array}{r} 20.000 \\ - 11.891 \\ \hline 8.109 \end{array}$$

### Exercise 2.14

1. Copy and complete

a.  $2.36$   
 $+ 0.49$

b.  $0.55$   
 $1.21$   
 $+ 0.63$

c.  $112.8$   
 $4.63$   
 $+ 10.015$

2. Add:

a.  $1.4 + 6 - 0.7$

b.  $3.6 + 12.2$

c.  $4.41 + 7 + 1.2$

d.  $13.5 + 0.23$

e.  $21 + 9.6$

f.  $71.6 + 4.7 + 0.51$

g.  $0.071 + 6.2 + 0.6$

h.  $1.23 + 0.061 + 0.2$

i.  $4.01 + 3.11 + 2.79$

j.  $21.4 + 8.013 + 2.14$

k.  $211.4 + 3.62 + 0.125$

l.  $4.188 + 0.022 + 4.6$

3. Copy and complete:

a.  $3.4$   
 $- 1.2$

b.  $12.7$   
 $- 1.8$

c.  $18$   
 $- 6.52$

4. Subtract:

a.  $6.8 - 3.4$

b.  $12.7 - 6.5$

c.  $6.5 - 4.7$

d.  $13.12 - 8.7$

e.  $12.2 - 3.11$

f.  $21 - 1.65$

g.  $7.5 - 0.23$

h.  $6.5 - 2.99$

i.  $13 - 8.69$

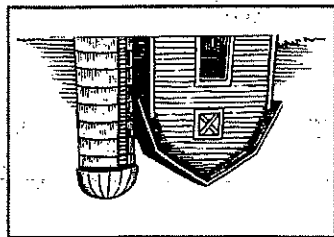
j.  $77 - 12.99$

k.  $507 - 12.69$

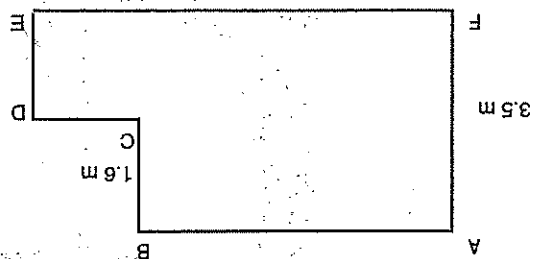
l.  $206.5 - 27.68$



5. Farmer John wants to build a fence around his house. If he bought 100 metres of fencing, how much fencing would he have left?



6. Find the length of DE.



7. Paul Sandy is digging a well. If he dug to a depth of 5.47m on the first day and down to a depth of 9.4m on the second day, how far did he dig on the second day?

8. On 1 October, John weighed 42.7kg and on 1 November, he weighed 43.53kg. How much weight did John gain?

Lei went to the shop to buy some fruit and vegetables. She bought:

5kg potatoes

0.75kg onions

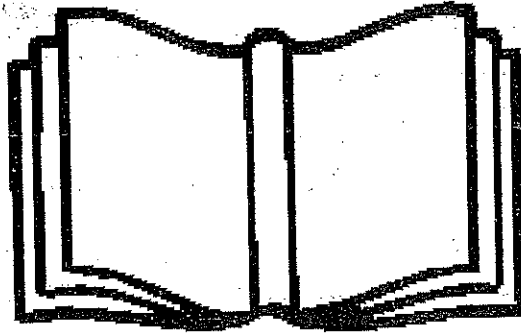
0.015kg garlic

1.38kg apples

- a. What was the total weight of the fruit and vegetables?  
 b. How much heavier were the potatoes than the apples?

10. Copy the answer grid into your book.

## Why was the writing paper not moving?



Answer the questions and use the code to find the answer to the riddle?

$\begin{array}{r} 2.6 \\ 3.1 \\ + 4.0 \\ \hline \end{array}$	$\begin{array}{r} 7.3 \\ 1.2 \\ + 5.4 \\ \hline \end{array}$	$\begin{array}{r} 0.5 \\ 8.9 \\ + 2.6 \\ \hline \end{array}$	$\begin{array}{r} 9.5 \\ 6.2 \\ + 7.7 \\ \hline \end{array}$	$\begin{array}{r} 4.4 \\ 2.0 \\ + 6.8 \\ \hline \end{array}$	$\begin{array}{r} 9.8 \\ 8.7 \\ + 7.6 \\ \hline \end{array}$
--	--	--	--	--	--

**U**

**S**

**O**

**E**

**R**

**T**

$\begin{array}{r} 3.52 \\ 2.13 \\ + 4.24 \\ \hline \end{array}$	$\begin{array}{r} 4.23 \\ 2.06 \\ + 5.79 \\ \hline \end{array}$	$\begin{array}{r} 7.36 \\ 5.28 \\ + 8.71 \\ \hline \end{array}$	$\begin{array}{r} 2.96 \\ 0.34 \\ + 7.58 \\ \hline \end{array}$	$\begin{array}{r} 6.3 \\ 2.54 \\ + 7.8 \\ \hline \end{array}$	$\begin{array}{r} 7. \\ 2.8 \\ + 9.54 \\ \hline \end{array}$
---	---	---	---	---	--

**A**

**C**

**W**

**I**

**E**

**Y**

$\begin{array}{r} 1.631 \\ 2.403 \\ + 7.082 \\ \hline \end{array}$	$\begin{array}{r} 5.377 \\ 8.906 \\ + 4.064 \\ \hline \end{array}$	$\begin{array}{r} 0.026 \\ 5. \\ + 3.29 \\ \hline \end{array}$	$\begin{array}{r} 9.407 \\ 2.63 \\ + 8.7 \\ \hline \end{array}$	$\begin{array}{r} 8.872 \\ 7.634 \\ + 9.501 \\ \hline \end{array}$
--	--	--	---	--

**A**

**A**

**B**

**T**

**S**

$\begin{array}{r} 5.36 \\ 0.287 \\ + 6.304 \\ \hline \end{array}$	$\begin{array}{r} 32.958 \\ 16.832 \\ + 25.06 \\ \hline \end{array}$	$\begin{array}{r} 52.6 \\ 7.075 \\ + 12.784 \\ \hline \end{array}$	$\begin{array}{r} 0.936 \\ 47.082 \\ + 23.765 \\ \hline \end{array}$	$\begin{array}{r} 26 \\ 34.036 \\ + 18.987 \\ \hline \end{array}$
---	--	--	--	---

**T**

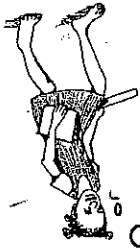
**I**

**N**

**A**

**S**

8.316	23.4	12.08	71.783	9.7	26.007	16.64	74.85	26.1	21.35	11.116	79.023
	13.9	11.951	9.89	20.737	10.88	12.0	72.459	18.347	13.2	19.34	



3 zeros  
mark in 2 zeros to make up the 3 places.

$$= 0.00136$$

$$= 001.36$$

$$1.36 \div 1000$$

$$b. 1.36 \div 1000$$

Solution:

Solution: There is one zero in 10 so the decimal point is moved 1 place to the left.  
Therefore,  $21.45 \div 10 = 2.145$

$$a. 21.45 \div 10$$

Examples:

When dividing by a power of 10 (10, 100, 1000, etc.) move the decimal point one place to the left for each zero in the power of 10.

**Division of decimals by 10, 100, 1000, etc.,**



add a zero to make up 3 decimal places

$$= 14610$$

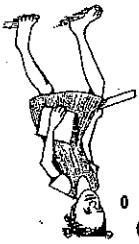
$$\text{Therefore, } 14.61 \times 1000$$

moves 3 places to the right.

Solution: There are 3 zeros in 1000, so the decimal point

Solution:

$$b. 14.61 \times 1000$$



decimal point moves 2 places to the right

$$= 3.5$$

$$a. 0.035 \times 100$$

Solution

Examples:

When multiplying by a power of 10, (i.e. 10, 100, 1000, etc.) move the decimal point one place to the right for each zero in the power of 10.

**Multiplication of decimals by 10, 100, 1000, etc.,**

**Exercise 2:15**

A. Evaluate:

- |                                 |                                |                        |
|---------------------------------|--------------------------------|------------------------|
| 1. $26 \times 10$               | 2. $3.1 \times 10$             | 3. $42.6 \times 100$   |
| 4. $53.8 \times 100$            | 5. $13.4 \div 10$              | 6. $16.8 \div 10$      |
| 7. $\frac{106.7}{100}$          | 8. $\frac{210.3}{100}$         | 9. $1.76 \times 1000$  |
| 10. $2.04 \times 100$           | 11. $\frac{4.32}{100}$         | 12. $\frac{8.61}{100}$ |
| 13. $0.065 \times 10$           | 14. $0.103 \times 10$          | 15. $0.43 \div 10$     |
| 16. $0.49 \div 10$              | 17. $407.1 \times 100$         | 18. $820.3 \times 100$ |
| 19. $\frac{281.6}{1000}$        | 20. $\frac{347.2}{1000}$       | 21. $0.03 \times 1000$ |
| 22. $0.07 \times 1000$          | 23. $\frac{0.6}{100}$          | 24. $\frac{0.8}{100}$  |
| 25. $42.8 \times 100 \div 1000$ | 26. $17.9 \times 1000 \div 10$ |                        |

B. Copy the answer grid into your book.

## What is a three-season bed?

Draw a line connecting each question with its answer. Each line will pass through a number and a letter giving the code to solve the riddle.

0.05 x 100 •	R	• 60.0
0.3 x 1000 •	12	• 5.00
0.7 x 10 • 4	N 2	• 200.0
2.0 x 100 •	T E	• 800
0.6 x 1000 •	6	• 0.60
0.06 x 10 •	3 13 9 N I 15	• 500.0
0.3 x 100 •	8	• 2.0
0.8 X 1000 •	7 P 5 W 0	• 70.0
0.02 X 10 •	H O	• 600.0
0.6 X 100 •	1 G 10 11	• 7000
0.5 X 1000 •	14	• 0.2
0.05 X 10 •	S	• 7.0
0.7 X 100 •		• 0.50
7.0 X 1000 •		• 30.0
0.2 X 10 •		• 300.0

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

**Exercise 2.16: Mixed decimal problems**

Using the signs  $<$ ,  $>$  or  $=$ , complete the following statements:

- a.  $0.5 \square 2.1$
  - c.  $2.01 \square 2.1$
  - e.  $6.2 \square 6.05$
  - g.  $3.010 \square 3.001$
  - i.  $0.062 \square 0.0062$
  - k.  $0.0038 \square 0.003$
  - m.  $0.52 \square 0.526$
  - o.  $0.405 \square 0.45$
- b.  $6 \square 0.6$
  - d.  $3.2 \square 3.02$
  - f.  $8.09 \square 8.1$
  - h.  $5.003 \square 5.030$
  - j.  $0.0051 \square 0.051$
  - l.  $0.007 \square 0.0073$
  - n.  $0.978 \square 0.98$
  - p.  $0.207 \square 0.027$

Write the following in ascending order:

- a. 3.62, 36.2, 0.362
  - c. 23.04, 23.4, 2.34, 2.034
  - e. 54.03, 5.43, 50.403, 5.403
  - g. 1.493, 1.943, 1.394, 1.439
  - i. 0.503, 0.526, 0.507, 0.500
  - k. 0.010, 0.011, 0.110, 0.111
- b. 4.06, 40.6, 4006
  - d. 17.2, 1.702, 17.02, 1.72
  - f. 6.027, 60.27, 60.027, 6.27
  - h. 1.276, 1.762, 1.672, 1.267
  - j. 0.72, 0.725, 0.702, 0.7005
  - l. 0.2, 0.202, 0.022, 0.220

Evaluate the following:

- a.  $4.26 + 5.73$
  - c.  $3.76 - 2.19$
  - e.  $0.42 + 1.065$
  - g.  $10.4 - 3.63$
  - i.  $100.5 + 0.736 + 21.82$
  - k.  $27.8 - 2.69$
  - m.  $0.02 + 5.7 + 208.062$
  - o.  $0.76 - 0.086$
  - q.  $10.1 + 1.01 + 1.01 + 0.101$
  - s.  $8.45 + 43.8 - 12.5$
  - u.  $0.54 + 3.6 - 0.207$
  - w.  $30.05 - 14.732 + 22.39$
  - y.  $302.5 - 30.25 + 3.025$
- b.  $8.41 + 2.95$
  - d.  $5.03 - 2.93$
  - f.  $3.02 + 0.504$
  - h.  $12.06 - 4.397$
  - j.  $86.59 + 0.032 + 18.3$
  - l.  $13.5 - 4.821$
  - n.  $5.86 + 39.247 + 0.3$
  - p.  $0.32 - 0.068$
  - r.  $0.605 + 60.5 + 6.05 + 605$
  - t.  $83.7 + 9.28 - 13.2$
  - v.  $4.2 + 0.17 - 1.416$
  - x.  $6.4 - 3.592 + 7.82$
  - z.  $46.07 - 40.67 + 4.607$

In one week the town of Bloom recorded the following amounts of rain:

Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
3.8cm	-	0.76cm	2.03cm	-	0.013cm	1.2cm

Calculate the total rainfall for that week.

The electronic timer in the olympic pool can time races into thousands

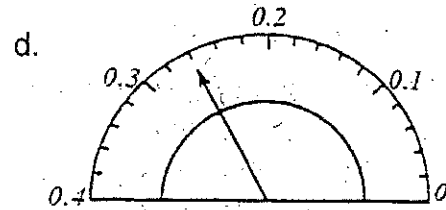
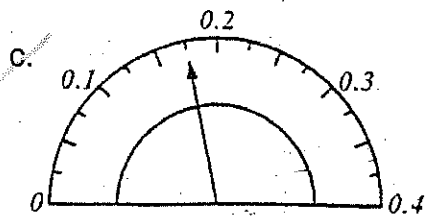
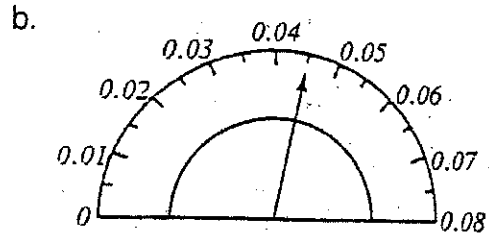
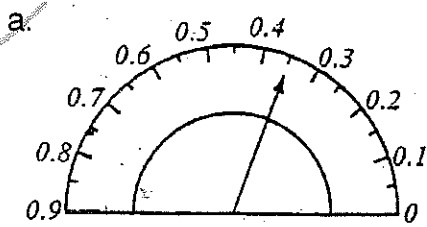
of a second. If first place recorded 32.07 seconds and second place

recorded 33.13 seconds, calculate the time difference between first and

second place.

Exercise 2.16 (continued)

6. On the following dials, read the value shown by the pointer:



7. Peter grew 3.6cm in one year. If he was 153.7cm tall at the beginning of that year, how tall was he at the end?

8. If the weight of a brick is 0.732kg, what is the weight of 100 bricks?

# Percentages

'Percent' means 'out of 100'.

The symbol for 'percent' is %.

17% means 17 out of 100.

$$\text{i.e. } 17\% = \frac{17}{100}$$

Thus a percentage is a fraction with 100 as the denominator.

Writing a percent as a fraction

## Examples

Write the following percentages as fractions in their simplest form:

a. 8%

Solution: 8% = 8 out of 100

$$= \frac{8}{100}$$

$$= \frac{2}{25}$$

b. 14%

Solution:

$$= \frac{14}{100}$$

$$= \frac{7}{50}$$

c. 150%

Solution:

$$= \frac{150}{100}$$

$$= \frac{3}{2}$$

## Writing a percentage as a decimal

Since a percent is a fraction out of 100, it can be written as a decimal.

**Examples** Write the following as decimals

a. 17%

Solution:  $17\% = \frac{17}{100}$   
 $= 0.17$

b. 5%

Solution:  $5\% = \frac{5}{100}$   
 $= 0.05$

c. 127%

Solution:  $127\% = \frac{127}{100}$   
 $= 1.27$

← as a fraction

2 numbers after the decimal point since it is a fraction out of 100.



## Writing fractions and decimals as a percent

To write a fraction or a decimal as a percent, we multiply by 100.

**Examples** Write as a percent:

a. 0.31

Solution:  $0.31 = 0.31 \times 100\%$   
 $= 31\%$

b.  $\frac{4}{5}$

Solution:  $\frac{4}{5} = \frac{4}{5} \times 100\%$   
 $= \frac{400}{5}\%$   
 $= 80\%$

c. 0.025

Solution:  $0.025 = 0.025 \times 100\%$   
 $= 2.5\%$



Exercise 2.17

1. Write as a fraction in its simplest form:

- a. 19%
- b. 25%
- c. 37%
- d. 92%
- e. 100%
- f. 20%
- g. 75%
- h. 50%
- i. 70%
- j. 140%
- k. 200%
- l. 12%
- m. 220%
- n. 1%
- o. 360%

2. Write each of the percentages in question 1 as decimals.

3. Write the following as percentages:

- a. 0.35
- b.  $\frac{1}{10}$
- c.  $\frac{5}{3}$
- d. 0.17
- e. 0.4
- f. 0.04
- g.  $\frac{7}{10}$
- h. 0.225
- i.  $\frac{20}{50}$
- j.  $\frac{1}{5}$
- k. 0.055
- l.  $\frac{9}{100}$
- m. 0.01
- n.  $\frac{2}{3}$
- o. 3.4

4. Copy the answer grid into your book.

Change the percentages to decimals, then write the letter in the correct place in the answer grid.

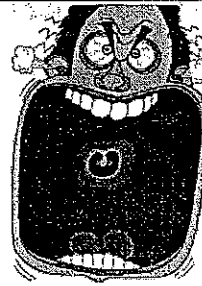
## What did the hat say to the necktie?

h	78% =	a	50.5% =	g	103% =
a	32% =	n	150% =	o	190% =
r	19% =	l	25.25% =	a	9.5% =
d	54%	n	95%	d	630% =
l	43.2% =			u	8.7% =
y	80.5% =	e	260% =	l	50% =
h	7.8% =	o	63% =	u	90% =
a	3.2% =	n	72.8% =	a	45% =
d	120% =	g	87% =	o	77% =

0.2525	0.50	0.432	1.03	0.63	0.032	0.78	2.60	0.32	1.20	0.505	1.50	0.54
0.805	1.90	0.90	0.078	0.45	0.95	0.87	0.095	0.19	0.77	0.087	0.728	6.30

5. Copy the answer grid into your book.

**What do you get if you  
mix aspirins with glue?**



Change the decimals to percentages  
to discover the code for the puzzle.

i	0.56 =	0.98 =	p
d	0.32 =	0.77 =	l
o	0.81 =	0.43 =	a
n	0.2 =	0.6 =	c
t	0.7 =	0.9 =	e
c	1.26 =	1.9 =	a
a	3.4 =	2.4 =	g
r	0.5 =	3.04 =	a
e	0.30 =	1.63 =	s
f	2.75 =	0.15 =	t
i	0.045	0.67 =	h
e	0.125 =	0.01 =	u
r	0.255 =	0.001	h

43%	126%	1%	50%	90%	275%	81%	25.5%	340%
163%	98%	77%	56%	15%	70%	4.5%	20%	240%
67%	30%	190%	32%	304%	60%	0.1%	12.5%	

**Exercise 2.18**

1. Mary spent 25% of her pocket money on clothes, 36% on food and saved the rest. What percent did she save?

2. Tom planted 100 lettuces and 17 died. What percent grew?

3. Three quarters of the oranges on a tree were ripe. What percentage was not ripe?

4. 60% of the children in a class can swim.

a. What fraction of the class can swim?

b. What fraction of the class cannot swim?

c. What percentage of the class cannot swim?

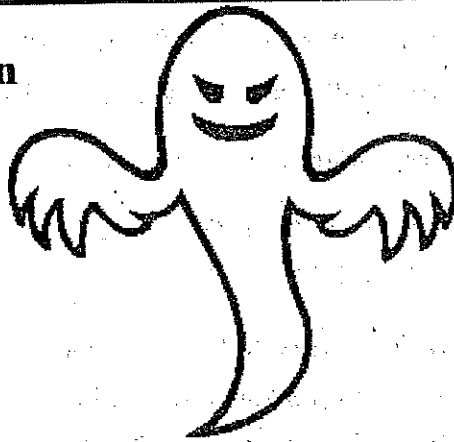
5. Match the items in list A with one in list B.

<b>List A</b>	<b>List B</b>
50%	$\frac{1}{5}$
60%	one quarter
25%	0.57
80%	$\frac{4}{3}$
57%	$\frac{5}{2}$
20%	0.60
75%	one half
40%	seven tenths
70%	Which is the odd one out?

6. Peter scored 24 out of 36 for his science test. What was his mark as a percentage?

7. Copy the answer grid into your book.

**What did the barman say when the ghost asked for a drink?**



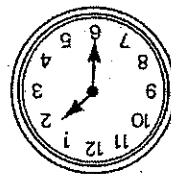
Match up the fractions and percentages by drawing a straight line between them, to and from the dots. The lines will pass through the letters giving you the answer code.

1.	$\frac{1}{3}$	•		A	•	25%		
2.	$\frac{1}{100}$	•	W		•	15%		
3.	$\frac{3}{4}$	•		C	E	•	70%	
4.	$\frac{1}{20}$	•	E			•	40%	
5.	$\frac{9}{10}$	•	N			•	90%	
6.	$\frac{1}{8}$	•		G		•	1%	
7.	$\frac{4}{5}$	•			J	•	$33\frac{1}{3}\%$	
8.	$\frac{3}{20}$	•	R		S	•	2%	
9.	$\frac{1}{4}$	•	V	N		•	80%	
10.	$\frac{2}{5}$	•	E		D	T	•	20%
11.	$\frac{7}{10}$	•	M	P	R		•	$12\frac{1}{2}\%$
12.	$\frac{2}{3}$	•		K	T	O	•	50%
13.	$\frac{1}{10}$	•				I	•	5%
14.	$\frac{19}{20}$	•					•	95%
15.	$\frac{1}{50}$	•	F		S		•	75%
16.	$\frac{17}{20}$	•		I			•	85%
17.	$\frac{1}{5}$	•	S	B		P	•	$66\frac{2}{3}\%$
18.	$\frac{1}{2}$	•					•	10%

	1	2	3	4	5	6
	7	8	9	10	11	
12	13	14	15	16	17	18

# Topic 3: Time and Money

Half-past one in the afternoon can be written in the following 2 ways:



This clock shows 1:30pm  
in 12-hour time.

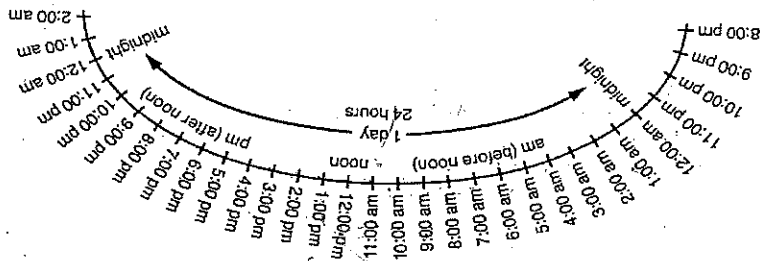
**13:30**

It is 13 hours and 30 minutes after midnight

This clock shows 1:30pm  
in 24-hour time.

## Exercise 3.1


1. Look at the time line.




What time is it:

- a. 2 hours after 7:00am?
- b. 12 hours after 9:00am?
- c. 5 hours before 1:00pm?
- d. 6 hours before noon?


Write the time shown on each clock in 12-hour and 24-hour time.




a.



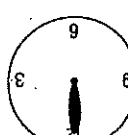
b.



c.



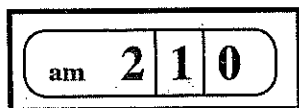
d.



e.

am
am
pm
pm
am

f.



g.



h.

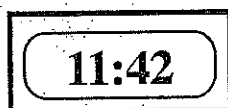


i.

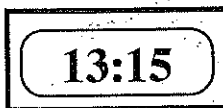


5:40

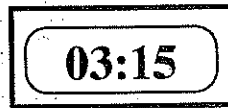
j.



k.



l.



3. a. 9:12 is the same time as \_\_\_\_\_ minutes past \_\_\_\_\_.  
 b. 3:47 is the same time as \_\_\_\_\_ minutes to \_\_\_\_\_.  
 c. 11:33 is the same time as \_\_\_\_\_ minutes to \_\_\_\_\_.  
 d. 8:45 is the same time as \_\_\_\_\_ to \_\_\_\_\_.

4. Copy and complete:

Remember 1hr = 60 minutes

a.  $\frac{1}{4}$ h =  min

b.  $\frac{1}{2}$ h =  min

c.  $\frac{3}{4}$ h =  min

d. 1h =  min

e.  $1\frac{1}{4}$ h =  h  min =  min

f.  $1\frac{3}{4}$ h =  h  min =  min

g.  $2\frac{1}{2}$ h =  h  min =  min

h.  $2\frac{3}{4}$ h =  h  min =  min

i.  h = 2h 15min =  min

j.  h = 3h 30min =  min

k.  h = 4h 0min =  min

l.  h = 4h 15min =  min

m.  h =  h  min = 90 min

n.  h =  h  min = 180min

5. Copy and complete:

Remember 1 minute = 60 seconds

a.  $\frac{1}{2}$ min = 0 min 30s =  s

b.  $\frac{1}{4}$ min =  min  s =  s

c.  $1\frac{1}{2}$ min =  min  s =  s

d.  $2\frac{3}{4}$ min =  min  s =  s

e.  min = 2 min 30s =  s

f.  min = 3 min 15s =  s

g.  min =  min  s = 300s

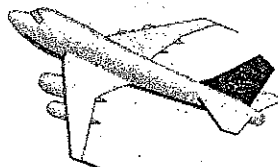
h.  min =  min  s = 600s

6. Rewrite each of these times in minutes.

a. Marathon winner: 2h 23min

b. Video lasts: 3h 57min

c. Flight time: 6h 5min



# How do you make the witch itch?



Directions: The answer to this question is written in code at the bottom of the page. To break the code, work out any problem and find the answer in code. Each time the answer appears in the code, write the letter of the problem above it.

How many minutes in:

2 hrs	1 hr $\frac{4}{2}$	1 hr $\frac{1}{2}$	3 hrs $\frac{1}{2}$	2 hrs 20 min
W	J	H	A	U
1 day $\frac{1}{2}$	1 hr $\frac{1}{5}$	1 day	1 day $\frac{4}{4}$	5 hrs
S	E	K	Y	T

15	140	720	300	300	210	1440	12	210	120	210	360	300	30	12	120
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Rewrite each of these times in hours and minutes
- Hockey match: 80 min
  - Tennis match: 192 min
  - Coach journey: 275 min

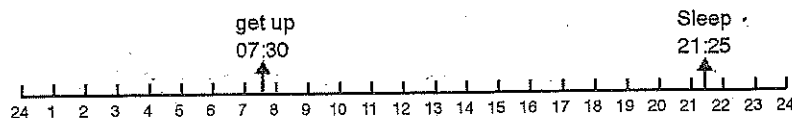
Copy the answer grid into your book.

## Periods of time

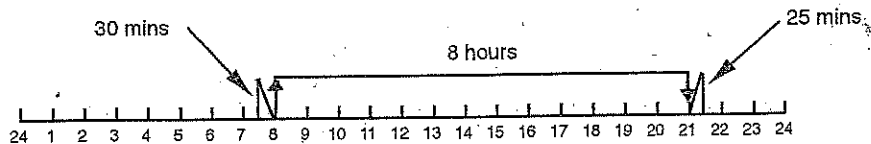
A time line can be useful for calculating lengths of time.

**Example 1** Jo gets up at 07:30. She goes to bed at 21:25. How long is Jo out of bed for?

**Solution:** Draw a timeline like this



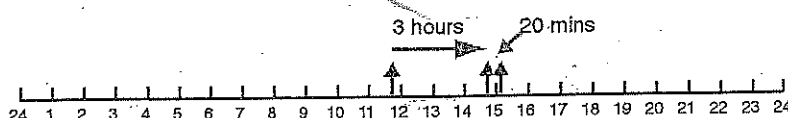
On your time line, mark the first whole hour after 07:30 and the last whole hour before 21:25



$$\begin{aligned} \text{Therefore, total time} &= 30\text{mins} + 8 \text{ hours} + 25 \text{ mins} \\ &= 8 \text{ hours } 55 \text{ minutes.} \end{aligned}$$

**Example 2** A laplap has to be cooked for 3h 20mins. If it is put into the oven at 11:45, at what time must it be taken out?

**Solution:** Draw a timeline marking in the times.

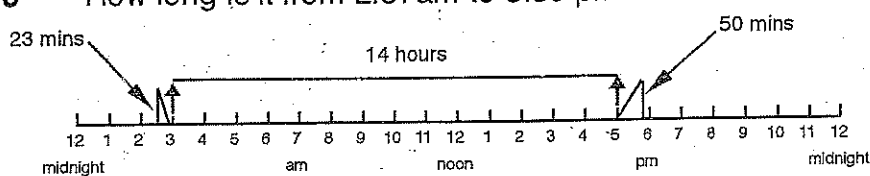


3 hours after 11:45 is 14:45

20 min after 14:45 is 15:05

Therefore, the laplap must be taken out at 15:05.

**Example 3** How long is it from 2:37am to 5:50 pm?

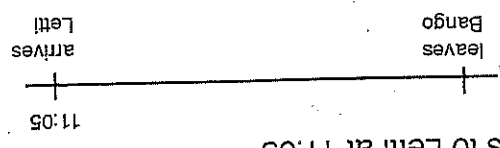


$$\begin{aligned} \text{Therefore, total time} &= 23\text{mins} + 14\text{hrs} + 50\text{mins} \\ &= 14\text{hrs} + 73\text{mins} \\ &= 14\text{hrs} + 1\text{hr} + 13\text{mins} \\ &= 15\text{hrs } 13\text{mins.} \end{aligned}$$



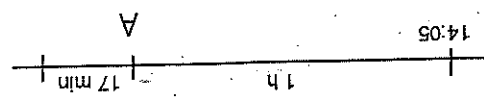
Exercise 3.2

A plane leaves Bango at 06:53. It gets to Letti at 11:05



- Copy this time line.
- Mark the missing time.
- Mark points for 07:00 and 11:00.
- Write down how long the journey takes.

A bus takes 1h 17min to make a journey.



- Look at the time line.
- What time should be written at point A?
- At what time does the bus arrive.

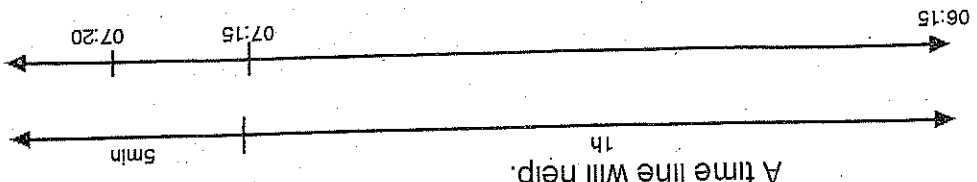
How long is it between:

- 6:00 a.m. and 11:20 a.m.
- 8:15 a.m. and 10:00 a.m.
- 7:25 a.m. and 8:05 a.m.
- 10:30 a.m. and 11:15 a.m.
- 6:35 a.m. and 7:05 a.m.
- 3:55 p.m. and 5:05 p.m.
- 11:15 a.m. and 4:40 p.m.
- 2:15 p.m. and 4:10 p.m.
- 2:50 p.m. and 11:40 p.m.
- 11:35 a.m. and 4:25 p.m.
- 9:15 p.m. and 5:50 a.m.

Write down the missing journey times:

Train	Departs	Arrives	Journey time
A	06:15	07:20	1h 5min
B	11:20	13:45	
C	13:50	14:25	
D	15:15	17:35	
E	23:20	02:10	

A time line will help.



**Exercise 3.2 (continued)**

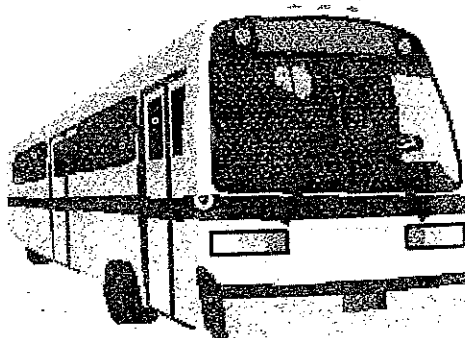
5. Write down what time each flight arrives.

<b>Flight</b>	<b>Departs</b>	<b>Arrives</b>	<b>Journey time</b>
MP 202	06:30		1h 15min
MP 203	07:42		1h 14min
MP 204	09:50		2h 45min
MP 306	10:45		3h 17min
MP 414	13:06		3h 55min



6. Write down the departure time for each coach.

<b>Coach</b>	<b>Departs</b>	<b>Arrives</b>	<b>Journey time</b>
L		18:24	9h 40min
M		08:23	30min
N		14:53	2h 38min
O		01:10	3h 30min
P		07:17	2h 36min



# Time and Timetables

## Exercise 3.3

A regular bus service is being planned for Eate. Here is the proposed timetable for Mondays, Wednesdays and Fridays.

	Monday	Wednesday	Friday
Port Vila	10:00	09:45	08:15
Mele Village	10:25	10:15	09:05
Lelepa Beach	11:05	11:00	10:05
Havanna Harbour	11:20	11:25	11:20
Onesua	11:55	12:10	11:50
Pang Pang	12:35	12:50	12:40
Eton	13:05	13:20	13:10
Erakor	14:10	14:10	14:05
Port Vila	14:30	14:35	15:05

- What time does the Monday bus leave Port Vila?
- What time does the Wednesday bus reach Onesua?
- How long does the Friday bus take to go from Port Vila to Lelepa?
- How long does it take the Friday bus to go from Port Vila and back?
- How long does the Wednesday bus take to go from Mele Village to Erakor?
- The Friday bus was 1 hour 35 minutes late. At what time would it arrive back in Port Vila?

2. This is Sita Bari's school timetable.

	Monday	Tuesday	Wednesday	Thursday	Friday
08:00	Maths	English	B Science	English	S Science
08:50	English	R.E.	B Science	Home Ec	S Science
09:40	<b>BREAK</b>				
10:10	Home Ec	Maths	English	Maths	B Science
11:00	Home Ec	French	S Science	Maths	B Science
11:50	<b>LUNCH</b>				
13:00	P.E.	Library	Science	French	Library
13:50	French	Art	Science	English	Art
14:40					

- Penny has her favourite subject last thing on Tuesday. What is her favourite subject?
- What time does the lesson start:
  - in 24-hour clock time?
  - in 12-hour clock time?
- How many minutes long is:
  - morning break?
  - lunch time?
- How many Maths lessons does Sita have each week?
  - How much time does she spend in Maths lessons each week?

3. This is part of a timetable for Vanair flights in 1997 from Vila to Tafea.

MONDAY					TUESDAY					THURSDAY				
FLT	DEP	FROM	TO	ARR	FLT	DEP	FROM	TO	ARR	FLT	DEP	FROM	TO	ARR
540	7:30	VLI	TAH	8:30	540	7:30	VLI	TAH	8:30	540	7:30	VLI	TAH	8:30
541	8:45	TAH	VLI	9:40	543	8:40	TAH	AWD	9:00	570	8:45	TAH	FTA	9:15
						9:10	AWD	IPA	9:25		9:25	FTA	AUY	9:55
542	10:30	VLI	DLY	11:10		9:35	IPA	VLI	10:20	571	10:05	AUY	TAH	10:35
	11:20	DLY	TAH	11:45						541	10:50	TAH	VLI	11:45
543	12:00	TAH	VLI	13:00										

- FLT - Flight no.      DEP - departure time      ARR - arrival time  
 VLI - Vila              TAH - Tanna              DLY - Dillons Bay  
 AWD - Aniwa          IPA - Ipota              FTA - Futuna  
 AUY - Aneityum

Exercise 3.3 (continued)

- a. On what day could I fly to:
  - i. Aniwa
  - ii. Futuna?
- b. How long does the Tuesday flight take to go from Vila to Aniwa?
- c. Mr Louna wants to travel on the Thursday flight from Vila to Aniwayum. How long does it take him to get to Aniwayum?
- d. Which places would you stop at if you are on the Tuesday flight from Vila to Ipotat?
- e. On Monday, the flight from Vila to Tanna through Dillons Bay is 34 minutes late leaving Vila
  - i. At what time does it reach Dillons Bay?
  - ii. If it is delayed for another 15 minutes, at Dillons Bay, when will it arrive at Tanna?
- f. On Thursday, Mrs Tari flies from Tanna to Aniwayum. How long does her flight take?

Calendars

Remember:

1 year = 365 days	1 year = 12 months	1 leap year = 366 days	1 decade = 10 years	1 century = 100 years
Number of days each month	Jan Feb Mar Apr May Jun	31 28* 31 30 31 30	Jul Aug Sep Oct Nov Dec	31 31 30 31 30 31
				* 29 in a leap year

Exercise 3.4

- How many months have exactly 31 days?
- Which month has an extra day during a leap year?
- How many months are there in a decade?
- How many months are there in one century?
- How many days are there from: (inclusive)
  - a. 3rd May to 31st May
  - b. 15th July to 31st May
  - c. 5th November to 3rd December
  - d. 16th March to 5th April
  - e. 20th September to 20th October
  - f. 18th March to 1st May
  - g. 25th December to 18th Jan
  - h. 29th June to 2nd September
  - i. 25th December to 3rd March (leap year)

11:45
10:35
9:55
9:15
8:30
7:45

6. a. Copy and complete:

- i. 1 week is 7 days
- ii. 2 weeks is 14 days
- iii. 3 weeks is  days
- iv. 4 weeks is  days
- v. 5 weeks is  days

b. Copy and complete

- i. 2 weeks 1 day is  days +  day which is  days
- ii. 4 weeks 6 days is  days +  days which is  days
- iii.  weeks  days is 14 days + 3 days which is  days
- iv.  weeks  days is 28 days + 5 days which is  days
- v.  weeks  days is 7 days +  days which is 9 days
- vi.  weeks  days is 14 days +  days which is 19 days
- vii.  weeks  days is  days +  days which is 38 days

7. How many weeks and days in 87 days?

8. a. Copy and complete:

- i. 1 year is 12 months
- ii. 2 years is 24 months
- iii. 3 years is  months
- iv. 4 years is  months
- v. 5 years is  months

b. Copy and complete

- i. 2 years 2 months is  months +  months which is  months
- ii. 5 years 11 months is  months +  months which is  months
- iii.  years  months is 24 months + 7 months which is  months
- iv.  years  months is 36 months + 9 months which is  months
- v.  years  months is 12 months +  months which is 17 months
- vi.  years  months is 24 months +  months which is 35 months
- vii.  years  months is  months + 6 months which is 54 months

**Reading Calendars**  
Exercise 3.5

Use the following calendar to answer the questions.

1999	
<p><b>JANUARY</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</p>	<p><b>FEBRUARY</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28</p>
<p><b>MARCH</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</p>	<p><b>APRIL</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30</p>
<p><b>MAY</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</p>	<p><b>JUNE</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30</p>
<p><b>JULY</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</p>	<p><b>AUGUST</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</p>
<p><b>SEPTEMBER</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30</p>	<p><b>OCTOBER</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</p>
<p><b>NOVEMBER</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30</p>	<p><b>DECEMBER</b></p> <p>S M T W T F S</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</p>

What day of the week is:

- a. 1 April
- b. 4 July
- c. 31 July
- d. 5 November?

On what day would you celebrate your birthday?

Which of the months:

- a. start on a Monday?
- b. end on a Wednesday?
- c. start on a Sunday?
- d. end on a Tuesday?

The Wana Football Club meets on the second Tuesday of every second month. If they meet on 9 March, what will be the dates of their next two meetings?

The Manangi Womens Association meets in the third Monday of every month. On what dates will they meet in July and September?

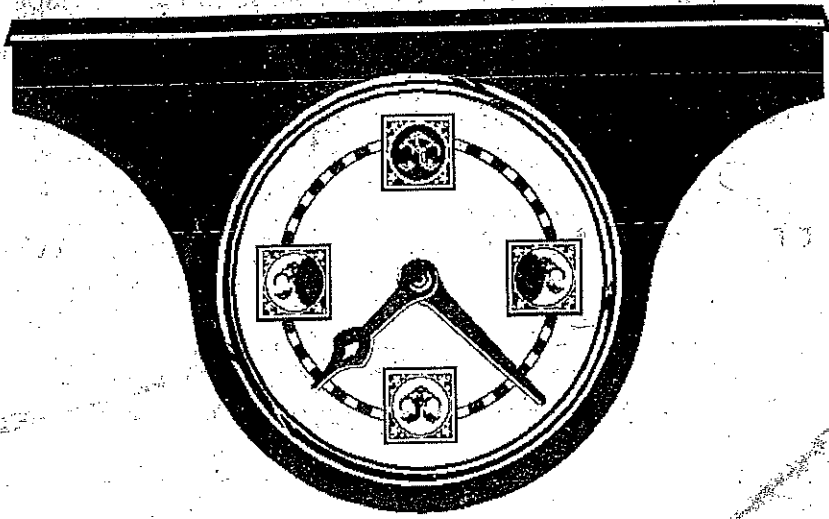
The longest day of the year is 21 December and the shortest day is 21 June. On what days of the week do these occur?

7. If Easter Sunday is on 18 April, what date is Good Friday?
8. What day of the week is Boxing day? (i.e. the day after Christmas.)
9.
  - a. How many days are there in February?
  - b. Is this a leap year or not?
10. Mary Makah had an appointment with the dentist on 16 February at 10:15a.m., but she changed the appointment for the same time two weeks later. What is the date and day of her new appointment?
11. The term 2 holidays start on the second Saturday of August and end on the fifth Sunday of August. What are the dates for term 2 holidays?
12. Kali's birthday is on 15 April. Tom's birthday is 1 week 3 days later. What is the date of Tom's birthday?

### Exercise 3.6 Mixed problems

1. What time is 30 minutes after 4:50p.m.?
2. What time is 42 minutes before 8:30a.m.?
3. How many seconds in 1 hour and 23 minutes?
4. What is the equivalent time to 14:30 hours?
5. How many minutes are there from 11:23a.m. to 12:07p.m.?
6. A train, due to arrive at 4:08p.m. was delayed and actually arrived at 7:53p.m. How long was it delayed?
7. The time in Melbourne, Australia, is 1 hour behind Vanuatu. If you telephoned your relative in Melbourne at 8p.m. Vanuatu-time, what time would it be in Melbourne?
8. If your relative telephoned you at 5p.m. Melbourne-time, what time would it be in Vanuatu?
9. A 3 hour 47 minutes plane journey begins at 11:24a.m. What would be the expected time of arrival? If the plane was 17 minutes early, when would it arrive?





10. The local Table Tennis Competition plays a 14 week competition before playing finals. If the season starts on 7 June and all games are played on Mondays, what will be the date of the first finals? If the grand final is played 3 weeks after the end of the season, what date will the grand final be played? (Use the calendar on page 129.)
11. The time in Germany is 9 hours behind the time in Victoria, Australia. If it is 3:00a.m. Sunday morning in Victoria, what is the time and day in Germany?
12. A plane leaves Melbourne Airport, Australia, at 4:15p.m. on Sunday and arrives in Frankfurt, Germany, 28 hours later. What time and day does it arrive in Frankfurt according to German time?
13. The return flight to Melbourne takes 23 hours. If the plane leaves Frankfurt at 9:00a.m. Tuesday, German time, what is the expected time of arrival in Melbourne.
14. A clock is 34 minutes slow:  
 a. What is the correct time when the clock shows 3:42p.m.?  
 b. What time does the clock show when the correct time is 10:25a.m.?

Exercise 3.6 (continued)

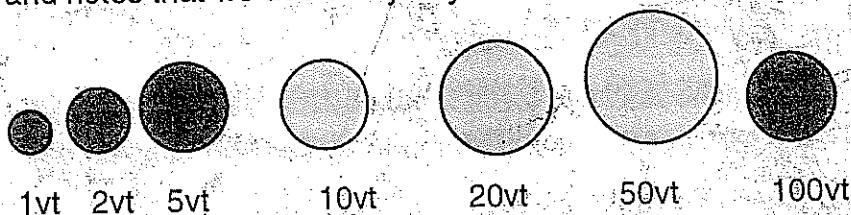
# Money

The basic unit of money in Vanuatu is the VATU (vt).

We have coins and notes that we use every day.

We have:

Coins:



Notes:



## Exercise 3.7

- Copy and complete the following table.  
The number in each column gives the number of each coin I have.



	1vt	2vt	5vt	10vt	20vt	50vt	100vt	Total Amount
a.	3	2		1		1		67vt
b.	2	1	1				1	
c.	3		2	3	2	2		
d.	6	5		1	1		1	
e.		4	1	3	2		2	
f.	3	4	2	4		3		
g.		3	9	2	1	6	1	
h.	5	7	6	4	2		3	
i.	4	5	7	6	2	3	1	
j.	3	4	8	1	3	2	2	42vt

- How many 10vt and 20vt coins would be needed to make up the following amount of money? There may be more than one way of doing this. Pick the way with the smallest number of coins.



### Exercise 3.8

1. Add:
  - a. 250vt, 355vt and 584vt
  - b. 8500vt, 2350vt, 1845vt and 555vt
2. Subtract:
  - a. 655vt from 2400vt.
  - b. 3495vt from 6175vt.
3. Hannah bought a dress for 5575 vatu and a pair of shoes for 6734 vatu. How much did she spend?
4. John bought 3 shirts for his sons at 895 vatu each. How much was that altogether?
5. What is the cost of 5 kilograms of potatoes at 95 vatu per kilogram?
6. Joseph is saving up for a bicycle that cost 12500 vatu. He has 7465 vatu so far. How much more does he need?
7. My electricity bill for January was 4716 vatu. My water bill was 1252 vatu less. How much was my water bill?
8. Five bottles of soft drink cost 335 vatu. What is the cost of one bottle?
9. I bought a pair of socks and 5 handkerchiefs for 1000vatu. If the socks cost 375 vatu what was the cost of one handkerchief?
10. A man's salary is 20450 vatu a month. How much does he earn in one year?
11. Each student in a class of 28 students had to buy a textbook that costs 995 vatu. What was the total amount of money spent on the books by the class?

Shopping Lists  
Exercise 3.9



apples: 350vt / kg



Bananas: 160vt / kg



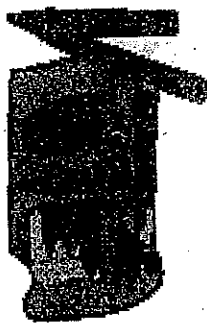
Milk: 175vt / litre



pineapples: 210vt / kg



Ice cream: 80vt / cone



crayons: 225vt / packet



Soda: 195vt / tin



Fish 350vt / kg

- Find the cost of each shopping list given:
- a. 2 litres of milk  
1 tin of soda  
 $\frac{1}{2}$  kg of apples  
1kg of fish
  - b.  $\frac{2}{3}$  kg of bananas  
3 cones of ice cream  
2kg of fish  
500g of pineapples
  - c.  $1\frac{1}{2}$  kg of bananas  
3kg of fish  
4 litres of milk  
2 packets of crayons
  - d.  $2\frac{1}{2}$  kg of fish  
 $1\frac{1}{2}$  kg apples  
 $\frac{4}{7}$  kg bananas  
5 tins of soda

Marg bought 2 litres of milk and some apples and paid with a 100vt note. If her change was 30vt, how many kg of apples did she buy?

For each of the shopping lists in question 1, find the change from a 500vt note.

How many tins of soda can you buy with a 500vt note? How much would your change be?

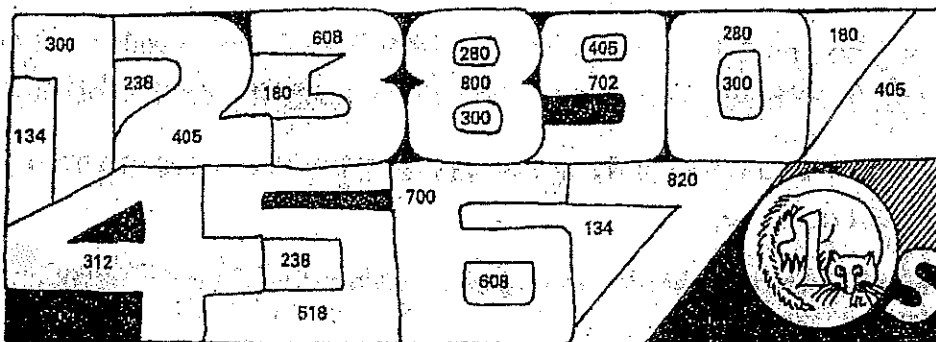
If I had a class of 25 Year 7's and I wanted to buy each one an ice cream, how much would I have to pay?

6. Tina paid 120vt for some bananas. What fraction of a kg of bananas did she buy?
7. Trace the answer grid at the bottom of the page.

## What will all these sweets cost?

Find the answer to each question below, in vatu. Colour in the regions, with these answers, in the grid you traced into your book.

1. 67 lollies, costing 2 vatu each.	6. 46 bags of mixed lollies at 20 vatu each bag.
2. 19 bags of potato chips worth 32 vatu a bag.	7. 17 coconut lollies costing 14 vatu each.
3. 27 pieces of cake which sell for 15 vatu each piece.	8. 39 packets of bubble gum selling for 18 vatu per bag.
4. 12 chocolate bars costing 25 vatu each.	9. 20 packets of bongos that sell for 40 vatu per packet.
5. 7 ice creams that are priced at 40 vatu each.	10. 18 candy bars if you can get 10 for 100 vatu.



Exercise 3.10 - Mixed problems

1. The cost of travelling on Vanair from Vila to Tanna for an adult is 950vt. The cost for a child is half of the adult fare. How much would it cost a family of 2 adults and 3 children to fly to Tanna from Vila?
2. A builder bought a house for 4,575,000vt. He spent 1,200,000 vatu on renovations and then he sold it for 7,650,000 vatu. How much profit did he make?
3. The cost of nine books is 2205 vatu.
  - a. What is the cost of one book?
  - b. How many books can be bought with 3575 vatu?
4. Copy and complete the following bill.
 

$6\frac{1}{2}$ kg of potatoes at 100vt / kg =	1560vt
4kg of stew at ___ vt / kg =	1095vt
___ jars of coffee at 365vt / jar =	
Total =	_____ vt
5. A worker in a private company is paid 340 vatu per hour. If he works for 40 hours a week:
  - a. calculate his weekly salary
  - b. calculate his salary for one year.
6. A school performed a play and charged 180 vatu for adults and 100 vatu for children. If 200 adults and 164 children attended, how much money did the school raise?
7. Paint can be bought in tins of two sizes:
  - 2 litre tin for 1400 vatu
  - 3 litre tin for 1950 vatu
 I need six litres of paint. How much would I pay if I bought:
  - a. three 2 litre tins
  - b. two 3 litre tins
 Which is cheaper?
8. Five people went out for a meal in a restaurant. The total cost of their meal was 9100 vatu. How much would each person pay if they all paid the same amount?
9. When a man works 4 hours, he is paid 1800vt. How much is he paid if he works 25 hours?
10. A man smokes 60 cigarettes a day. A packet of 20 cigarettes cost 320 vt. How much money does he spend on cigarettes in:
  - a. one day?
  - b. one week?



11. I have lots of 4vt, 7vt and 9vt stamps. How many of each stamp would I need if I wanted to post a letter costing: (there is more than one answer; choose the one that uses the least number of stamps)
- a. 16vt    b. 25vt    c. 34vt    d. 40vt    e. 49vt
12. Copy the answer grid into your book.

## Why did the banana go out with the prune?

Find the cost of each set of items. The letters next to the amounts give the puzzle code.

1 tub of margarine at 714vt for 6 tubs _____	<input type="text"/>	S	
3 packets of potato chips at 123vt each _____	<input type="text"/>	D	current total
8 packets of jelly crystals at 5 packets for 120vt _____	<input type="text"/>	A	vt E
2 cans of salmon at 1044vt per dozen _____	<input type="text"/>	E	
4 packs of spaghetti a 78vt a pack _____	<input type="text"/>	O	current total
11 cans of WOOF dog food at 114vt per can _____	<input type="text"/>	T	vt F
5 bottles of lemonade at 108vt each bottle _____	<input type="text"/>	B	
2 packets of cereal at 1130vt for 10 packets _____	<input type="text"/>	T	current total
3 bricks of cheddar cheese at 1140vt a dozen _____	<input type="text"/>	N	vt D
4 kilograms of sugar at 354vt for 3 kilograms _____	<input type="text"/>	H	
7 tooth brushes on special at 5 for 450vt _____	<input type="text"/>	U	current total
8 bars of soap at 94vt for a twin pack _____	<input type="text"/>	D	vt C
450g of coffee at 317vt for the 150g jar _____	<input type="text"/>	E	current total
3 No 12 chickens at 391vt each _____	<input type="text"/>	I	vt A
5 litres of ice cream at 87vt per litre _____	<input type="text"/>	C	current total
5 litres of orange juice at 207vt for the 2 litre bottle and 113vt for the litre bottle _____	<input type="text"/>	A	vt U
3 packets of Crunch biscuits at 148vt for 2 packets _____	<input type="text"/>	E	
7 tins of baked beans at 576vt per dozen _____	<input type="text"/>	N	FINAL COST
	<input type="text"/>		vt L

540	222	4573	192	7508	119	488	472	951
	435	312	630	8593	3186	285	1254	
1166	1173	336	369	527	376	5900	226	174