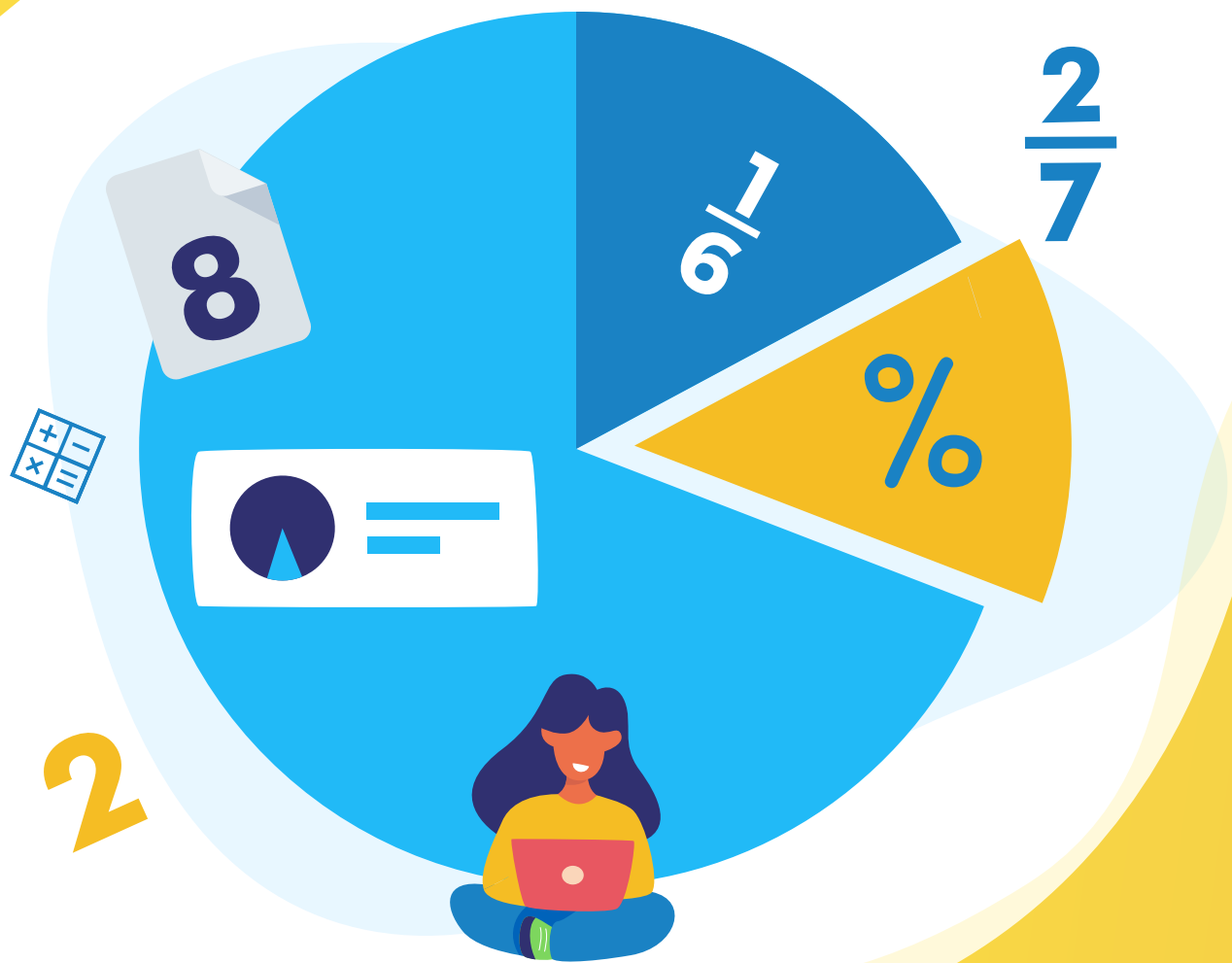


Mathletics

Fraction Worksheets



Student book

Grade 7



Proper fractions

Proper fractions represent parts of a whole number or object.

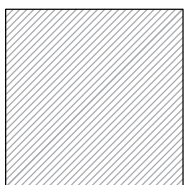


numerator \longrightarrow $\frac{1}{2}$ \longleftarrow number of equal parts **you have**
denominator \longrightarrow $\frac{1}{2}$ \longleftarrow **total** number of equal parts

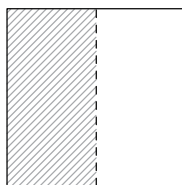
The numerator is always smaller than or equal to the denominator in proper fractions.

Let's look at some equally sized shaded shapes.

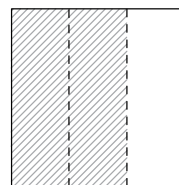
(i) Write a fraction for the shaded parts of the squares below:



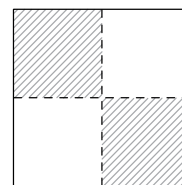
1 whole square



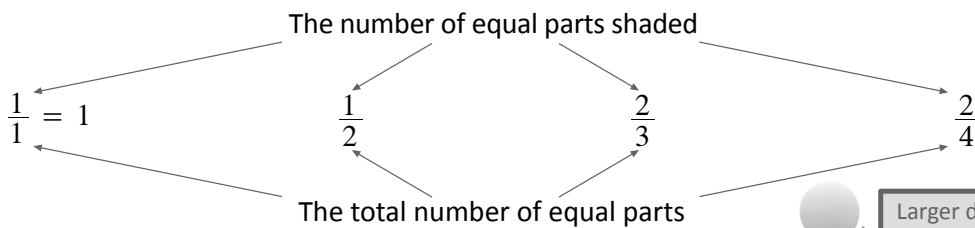
Split into 2 equal parts



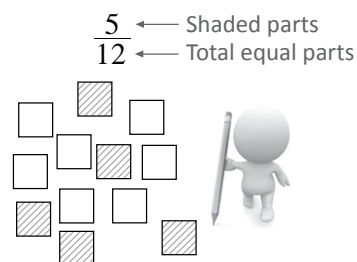
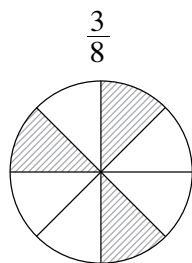
Split into 3 equal parts



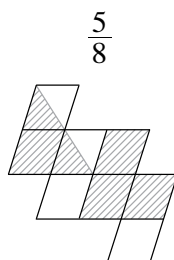
Split into 4 equal parts



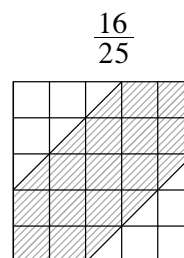
(ii) Shade these to match the fraction:



(iii) Include at least two half-shapes when shading these to match the fraction:



Two halves = 1 whole

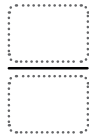
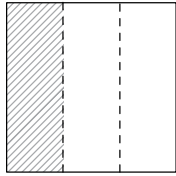




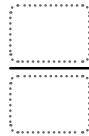
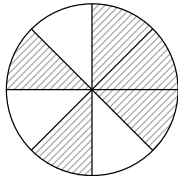
Proper fractions

1 What fraction of these equal-sized shapes have been shaded?

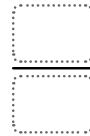
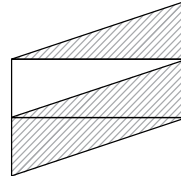
a



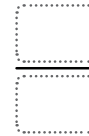
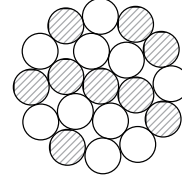
b



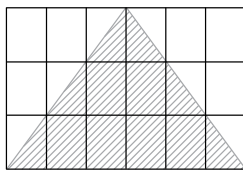
c



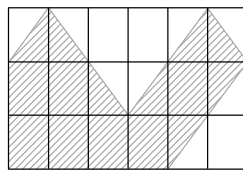
d



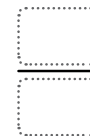
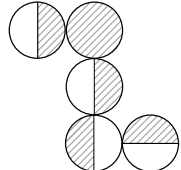
e



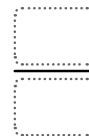
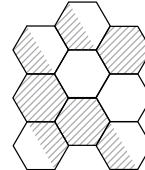
f



g



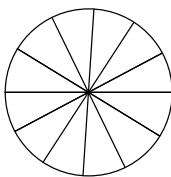
h



2 Shade these to match the given fraction:

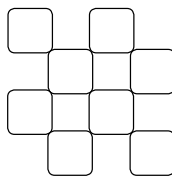
a

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



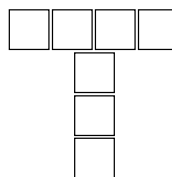
b

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



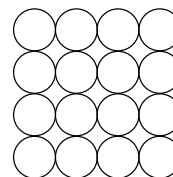
c

$$\frac{3}{7}$$



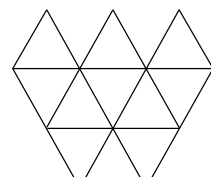
d

$$\frac{11}{16}$$



e

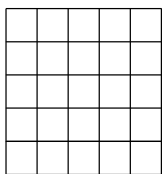
$$\frac{4}{10}$$



3 Shade these to match the given fraction, including **at least** one pair of half-shapes:

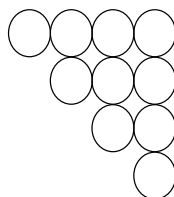
a

$$\frac{9}{25}$$



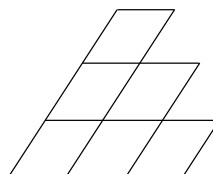
b

$$\frac{3}{10}$$



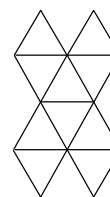
c

$$\frac{5}{6}$$



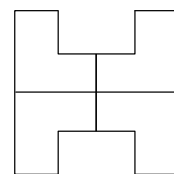
d

$$\frac{7}{10}$$



e

$$\frac{1}{4}$$





Proper fractions

4 Draw and shade diagrams with equal sized shapes to represent each of these fractions:

(i) Shading whole shapes only.

(ii) Including at least one pair of half-shaded shapes.

a $\frac{3}{5}$

(i)

(ii)

b $\frac{2}{9}$

(i)

(ii)

c $\frac{5}{8}$

(i)

(ii)

d $\frac{4}{7}$

(i)

(ii)

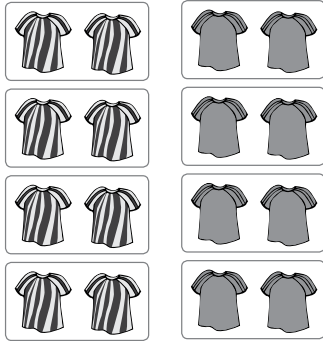


Equivalent proper fractions

These are fractions with different numbers that represent the same amount.

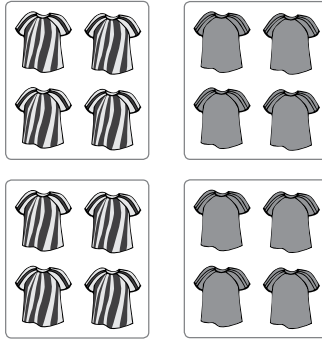
For example, two fitness teams do three sessions of training in the same park.

Session 1: Grouped in pairs



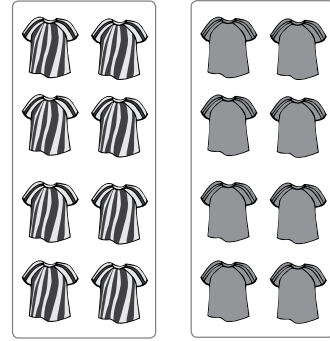
$$\frac{4}{8}$$

Session 2: In groups of four



$$\frac{2}{4}$$

Session 3: Grouped as a whole team



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

Fraction of training groups wearing striped (or plain) shirts in each session.

The **groups change size** but the total **number of people** training **remains the same**

$$\therefore \frac{4}{8} = \frac{2}{4} = \frac{1}{2} = \text{Equivalent fractions}$$

We find equivalent fractions by dividing/multiplying the numerator and denominator by the same number.

Write an equivalent fraction for each of these using the multiplication or division given in square brackets

(i) $\frac{3}{5} [\times 3]$

$$\frac{3 \times 3}{5 \times 3} = \frac{9}{15}$$

$$\therefore \frac{3}{5} \text{ and } \frac{9}{15} = \text{equivalent fractions}$$

(ii) $\frac{12}{32} [\div 4]$

$$\frac{12 \div 4}{32 \div 4} = \frac{3}{8}$$

$$\therefore \frac{12}{32} \text{ and } \frac{3}{8} = \text{equivalent fractions}$$

Simplify these fractions by dividing the numerator and denominator by the greatest common factor (GCF)



Simplify = Find the smallest equivalent fraction. 😊

(i) $\frac{3}{9}$

GCF for 3 and 9 is: 3

$$\therefore \frac{3 \div 3}{9 \div 3} = \frac{1}{3}$$

$$\therefore \frac{1}{3} \text{ is the simplest equivalent fraction to } \frac{3}{9}$$

(ii) $\frac{18}{24}$

GCF for 18 and 24 is: 6

$$\therefore \frac{18 \div 6}{24 \div 6} = \frac{3}{4}$$

$$\therefore \frac{3}{4} \text{ is the simplest equivalent fraction to } \frac{18}{24}$$

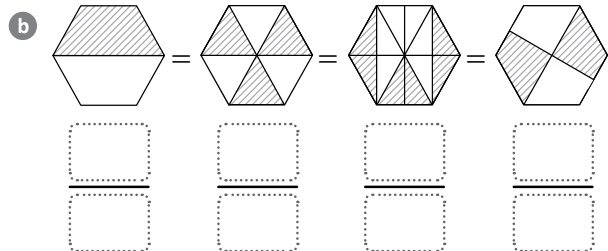
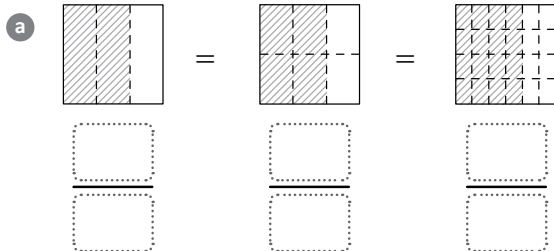
GCF: the largest number that divides into both exactly





Equivalent proper fractions

- 1 Write the equivalent fractions represented by these equally-sized shaded areas:



- 2 Write an equivalent fraction for each of these using the multiplication or division given in square brackets:

a $\frac{1}{4} [\times 5]$

b $\frac{8}{10} [\div 2]$

c $\frac{3}{5} [\times 3]$

d $\frac{12}{24} [\div 6]$

- 3 Simplify these fractions by dividing the numerator and denominator by the greatest common factor (GCF).

a $\frac{16}{20}$

b $\frac{8}{32}$

- 4 Simplify these two fractions.

a $\frac{14}{21}$

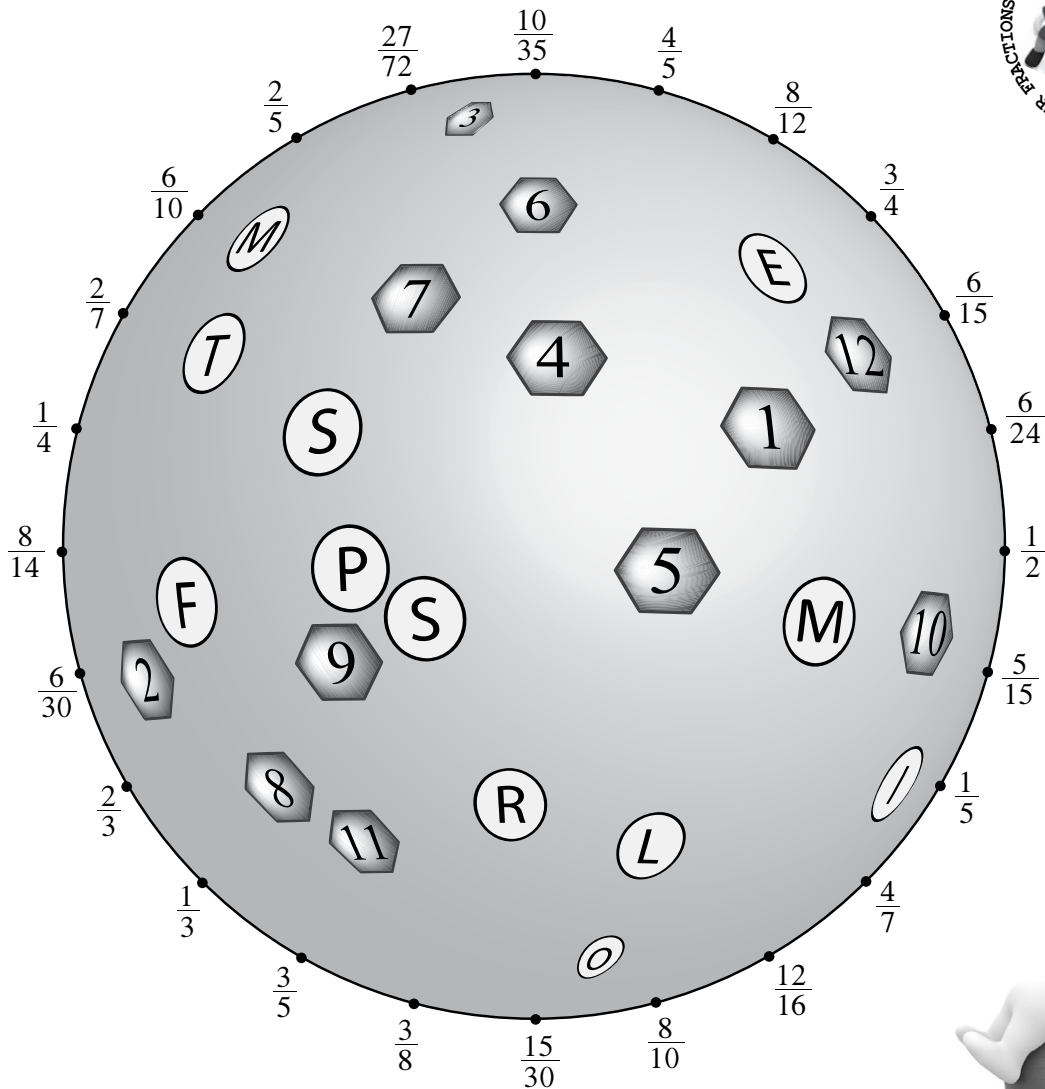
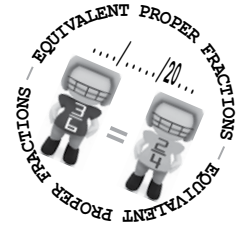
b $\frac{16}{24}$

- 5 Are the fractions $\frac{14}{21}$ and $\frac{16}{24}$ from question 4 equivalent fractions? Briefly explain your answer.



Equivalent proper fractions

- 6 Match the pair of equivalent fractions below by joining them with a straight line. Solve the puzzle by matching the letter with the number each straight line passes through.



Two rows of circles for matching. The first row has 8 circles, and the second row has 4 circles. Below the first row are numbers 1 through 8, and below the second row are numbers 9 through 12.

Improper fractions and mixed numbers

An improper fraction has a bigger numerator (top) than denominator (bottom).

$$\frac{3}{2} \longleftarrow \text{Improper fractions} \longrightarrow \frac{5}{4}$$

numerator > denominator

> means "bigger than"

Mixed numbers have a whole number and a proper fraction.

$$1\frac{1}{2} \longleftarrow \text{Mixed numbers} \longrightarrow 1\frac{1}{4}$$

a "mix" of whole numbers and proper fractions



Mixed numbers are simplified improper fractions.

Simplify these:

Improper fractions to mixed numbers

(i) $\frac{5}{3}$

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

$$\frac{\text{numerator}}{\text{denominator}} = \text{numerator} \div \text{denominator}$$

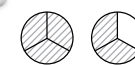
$$= 1 \text{ r } 2$$

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

remainder

Whole number answer

same denominator



(ii) $\frac{14}{4}$

$$\frac{14}{4} = \frac{7}{2} = 7 \div 2 \quad \text{Simplify if possible}$$

$$= 3 \text{ r } 1$$

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

remainder

Whole number answer

same simplified denominator

picture form



Mixed numbers to improper fractions

(i) $1\frac{2}{3}$

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

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

same denominator

(ii) $2\frac{1}{5}$

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

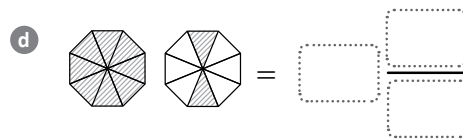
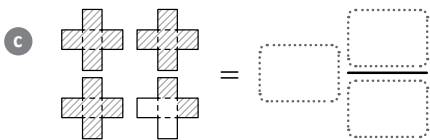
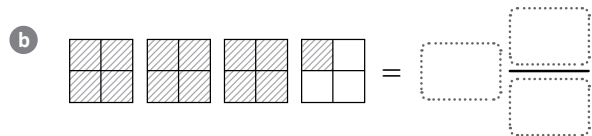
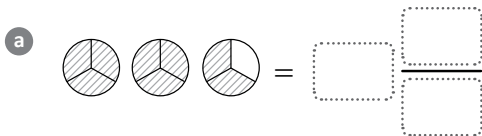
$$= \frac{11}{5}$$

same denominator

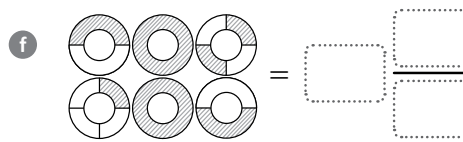
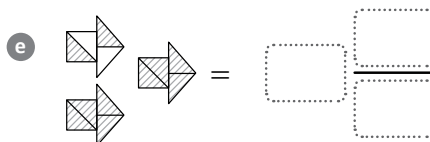


Improper fractions and mixed numbers

1 Write the mixed numbers represented by these shaded diagrams:



Make sure you write the fraction in simplest form where possible.



2 Simplify these improper fractions by writing them as mixed numbers.

a $\frac{12}{5}$

b $\frac{14}{3}$

c $\frac{23}{2}$



3 Write these fractions in simplest form first, then change to mixed numbers.

a $\frac{15}{9}$

b $\frac{21}{14}$

c $\frac{18}{16}$

4 Write the equivalent improper fraction for these mixed numbers.

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

b $2\frac{3}{4}$

c $4\frac{4}{5}$

5 Write the equivalent improper fraction for these mixed numbers after first simplifying the fraction parts.

a $4\frac{2}{12}$

b $2\frac{6}{24}$

c $25\frac{24}{72}$

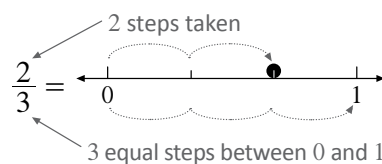
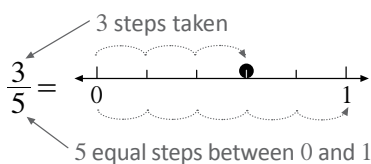
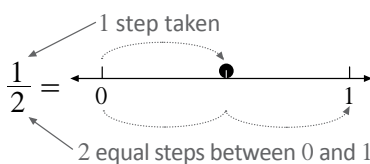
Fractions on the number line

Proper fractions represent values between 0 and 1 on a number line.

$$\frac{1}{2} \begin{array}{l} \leftarrow \text{number of equal steps taken between 0 and 1} \\ \leftarrow \text{total number of equal steps between 0 and 1} \end{array}$$

Mark equal-sized steps matching the denominator between 0 and 1, then plot the fraction using the numerator.

Display the fractions $\frac{1}{2}$, $\frac{3}{5}$ and $\frac{2}{3}$ on these number lines

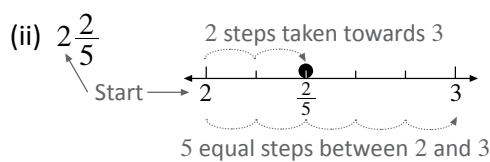
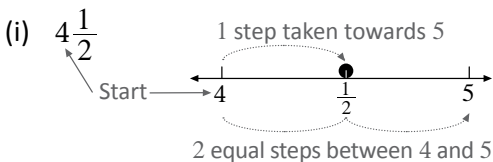


For mixed numbers, plot the fraction between the given whole number and the next whole number.

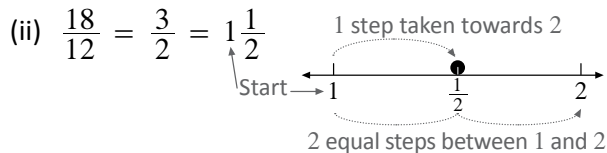
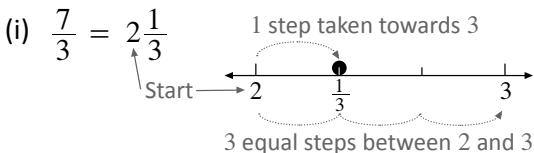
Start from this whole number $\rightarrow 3 \frac{1}{2}$ $\begin{array}{l} \leftarrow \text{number of equal steps towards the next whole number '4'} \\ \leftarrow \text{total number of equal steps between '3' and the next whole number '4'} \end{array}$

Display and read these fractions on a number line

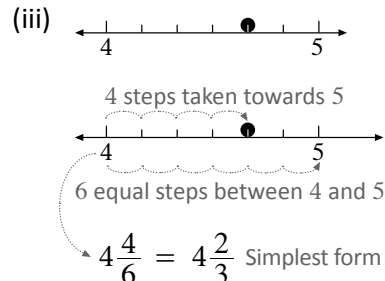
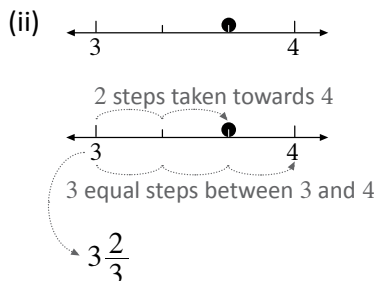
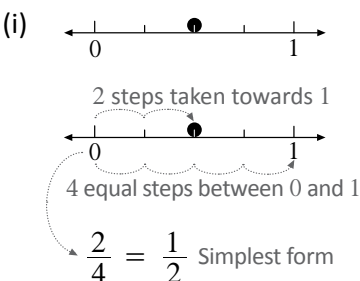
Mixed numbers



Improper fractions – simply change to the equivalent mixed number first then show on the number line

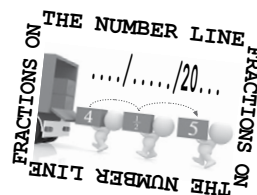


Write down the fraction displayed on these number lines

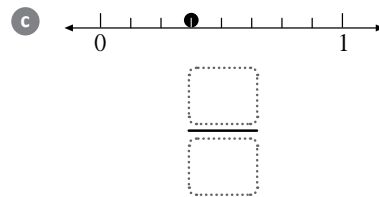
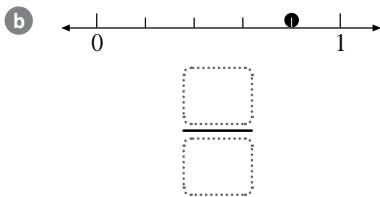
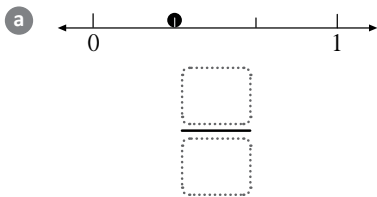




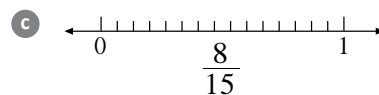
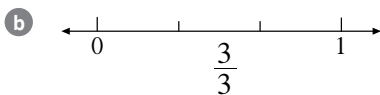
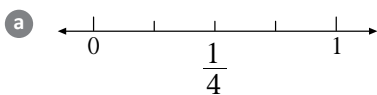
Fractions on the number line



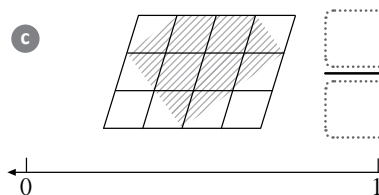
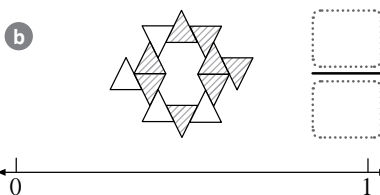
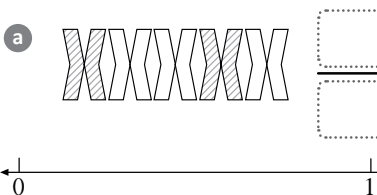
- 1 What proper fraction do the following points on the number line represent?



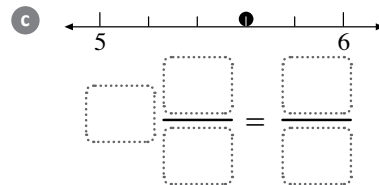
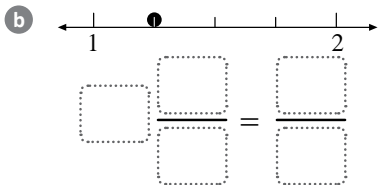
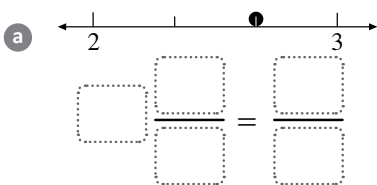
- 2 Display these fractions on a number line:



- 3 Write and display the fraction of equal shapes shaded on a number line for these diagrams:



- 4 Write the mixed number and equivalent improper fraction for the dots plotted on these number lines:

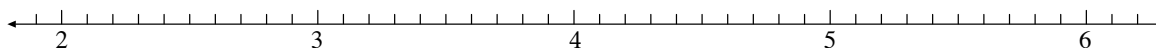


- 5 Display these improper fractions on the number line:

a $\frac{27}{10} =$

b $\frac{11}{2} =$

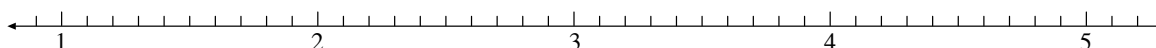
c $\frac{22}{5} =$



a $\frac{42}{15} =$

b $\frac{63}{18} =$

c $\frac{110}{25} =$



Mathletics



A 3P Learning Product