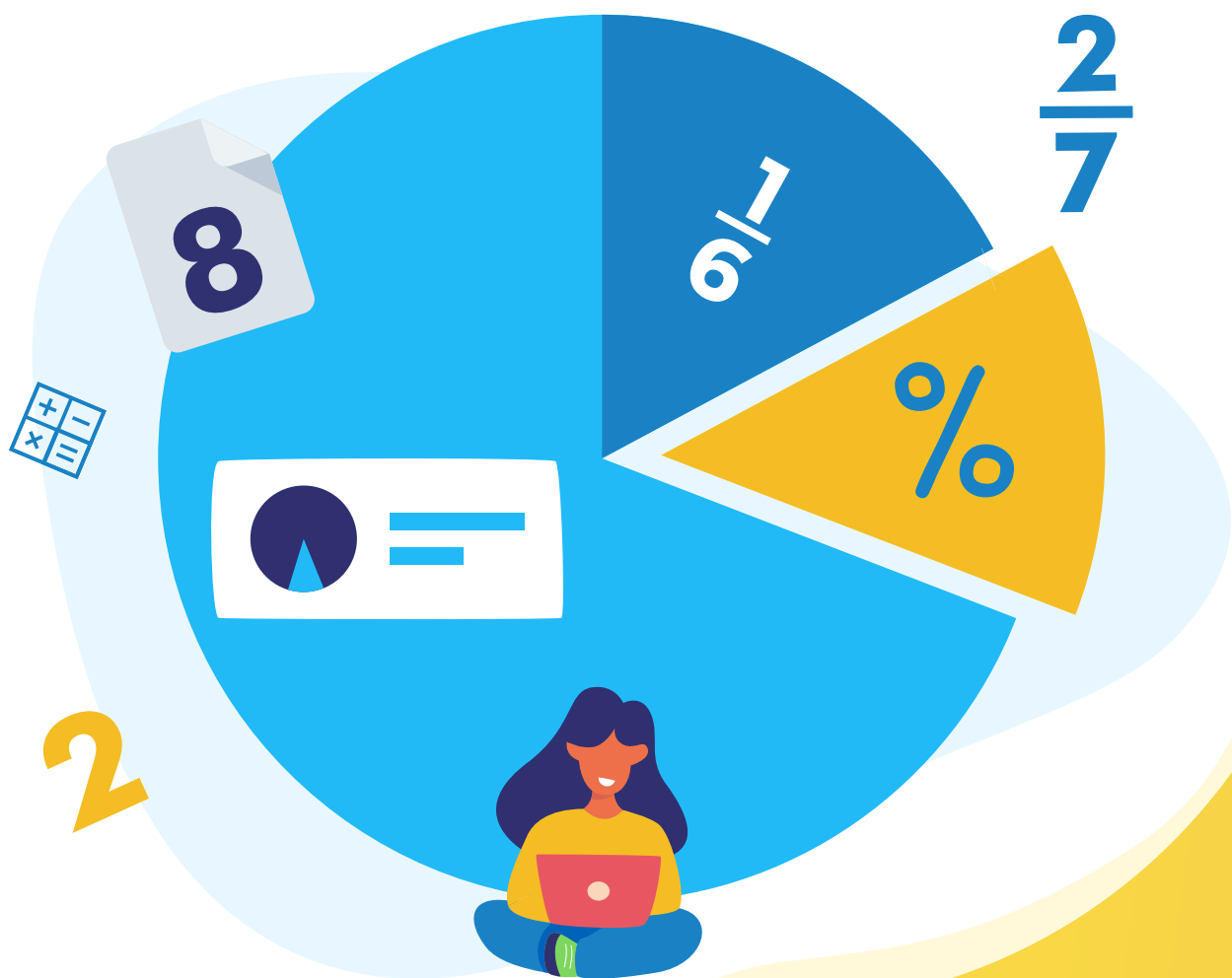


Mathletics

Fraction Worksheets



Student book

Year 7



Proper fractions

Proper fractions represent parts of a whole number or object.

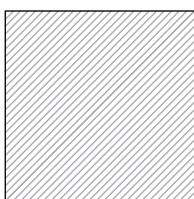


numerator \longrightarrow $\frac{1}{2}$ \longleftarrow number of equal parts **you have**
denominator \longrightarrow $\frac{1}{2}$ \longleftarrow **total** number of equal parts

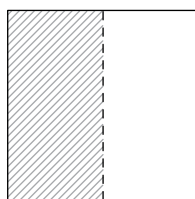
The numerator is always smaller than or equal to the denominator in proper fractions.

Let's look at some equally sized shaded shapes.

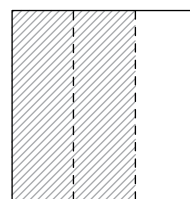
(i) Write a fraction for the shaded parts of the squares below:



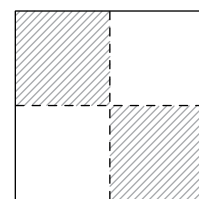
1 whole square



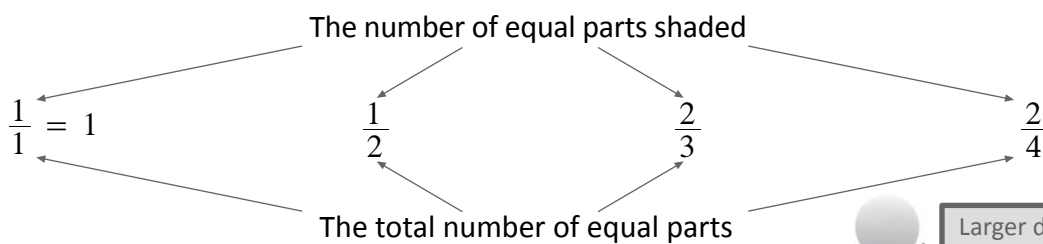
Split into 2 equal parts



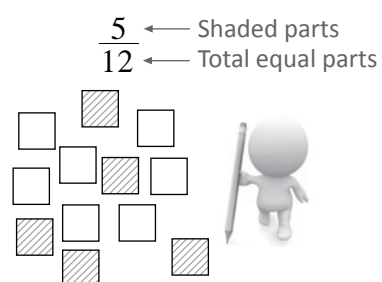
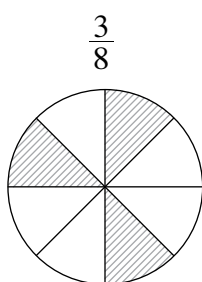
Split into 3 equal parts



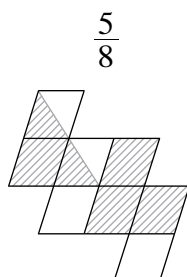
Split into 4 equal parts



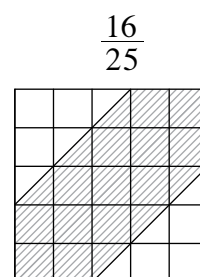
(ii) Shade these to match the fraction:



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



Two halves = 1 whole

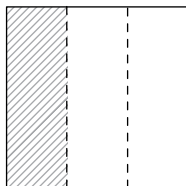




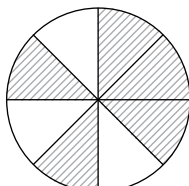
Proper fractions

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

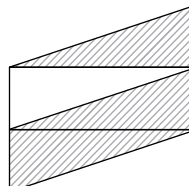
a



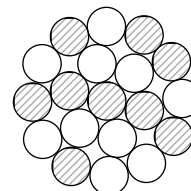
b



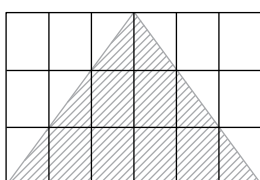
c



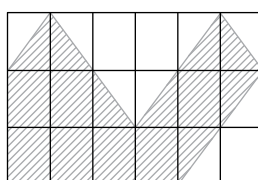
d



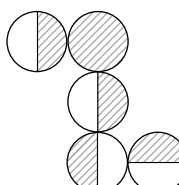
e



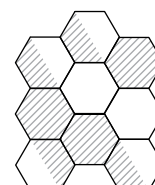
f



g



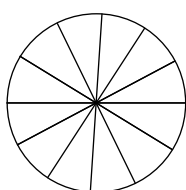
h



2 Shade these to match the given fraction:

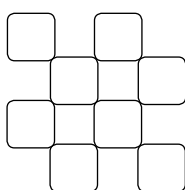
a

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



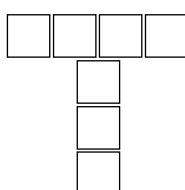
b

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



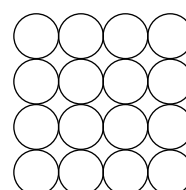
c

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



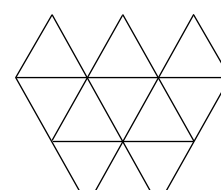
d

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



e

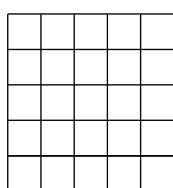
$$\frac{4}{10}$$



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

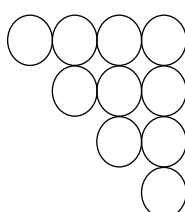
a

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



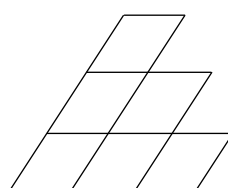
b

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



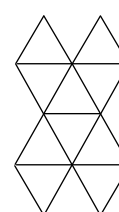
c

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



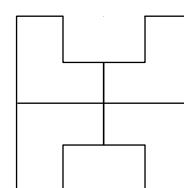
d

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



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 $\frac{4}{7}$

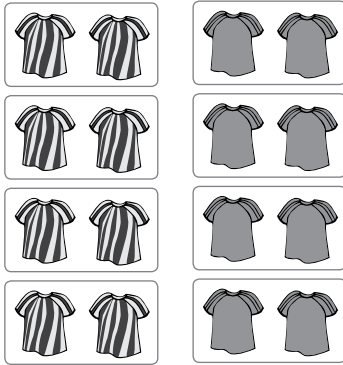
(i)

(ii)

Equivalent proper fractions

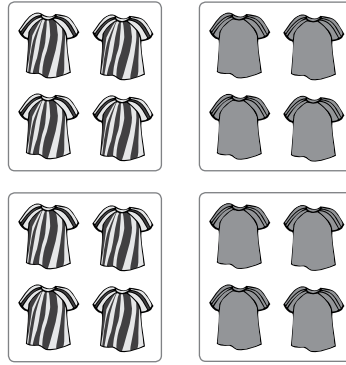
These are fractions with different numbers that represent the same amount.
For example, two fitness teams do three sessions of training in the same park.

Session 1: Grouped in pairs



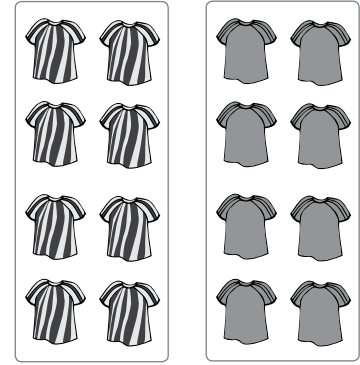
$$\frac{4}{8}$$

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 highest common factor (HCF)



Simplify = Find the smallest equivalent fraction. 😊

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

HCF 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) $\frac{18}{24}$

HCF for 18 and 24 is: 6

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

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

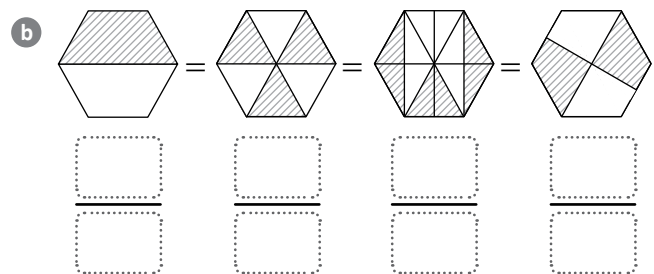
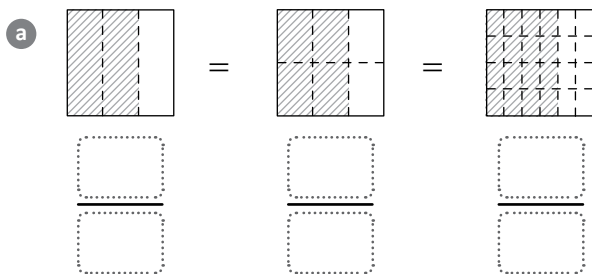


HCF: the largest number that divides into both exactly



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 highest common factor (HCF).

a $\frac{16}{20}$

b $\frac{8}{32}$

4 Simplify these two fractions.

a $\frac{14}{21}$

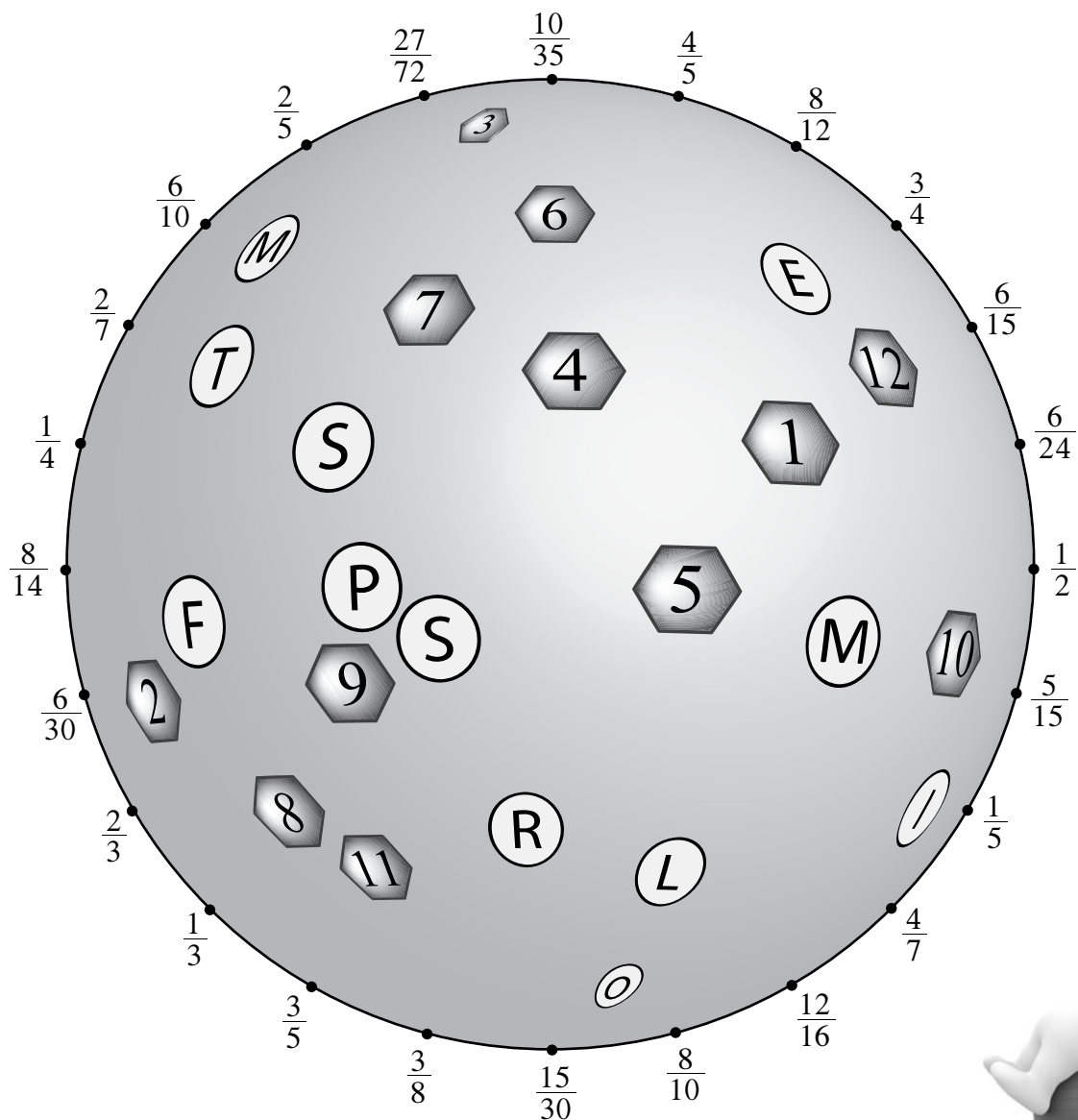
b $\frac{16}{24}$

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.



Improper fractions and mixed numerals

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 numerals have a whole number and a proper fraction.

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

A 'mix' of whole numbers and proper fractions.



Mixed numerals are simplified improper fractions.

Simplify these

Improper fractions to mixed numerals

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

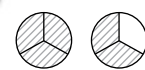
$$\frac{5}{3} = 5 \div 3$$

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

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

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

Whole number answer \rightarrow remainder \rightarrow same denominator



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

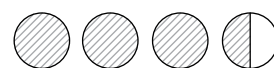
$$\frac{14}{4} = \frac{7}{2} = 7 \div 2 \quad \text{Simplify if possible}$$

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

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

Whole number answer \rightarrow remainder \rightarrow same simplified denominator

picture form



Mixed numerals 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 numerals

1 Write the mixed numerals represented by these shaded diagrams:

a



b

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

c

The diagram shows two identical cross-shaped figures, each composed of five squares. The top square and the four side squares are shaded with diagonal lines, while the bottom square is white. This is followed by an equals sign, and then a large square divided into two smaller squares by a horizontal line.

d

$\frac{\quad}{\quad}$

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

e

The diagram shows two identical 2x2 grids of triangles on the left, followed by an equals sign, and then a 2x2 grid of squares on the right. Each square in the grid on the right is composed of four triangles from the grids on the left.

f

= /

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

a $\frac{12}{5}$

b $\frac{14}{3}$

c $\frac{23}{2}$

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

a $\frac{15}{9}$

b $\frac{21}{14}$

c $\frac{18}{16}$

4 Write the equivalent improper fraction for these mixed numerals.

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

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

C $4\frac{4}{5}$

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

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

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

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

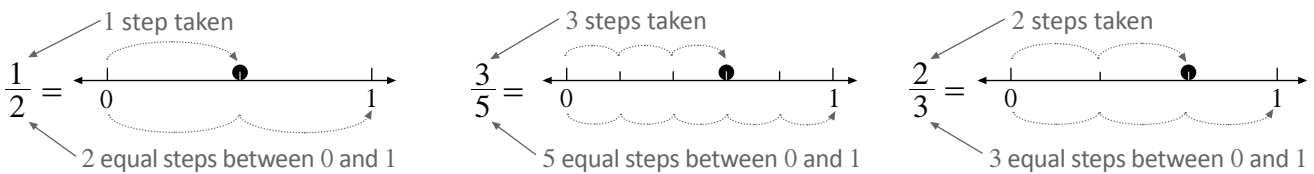
Fractions on the number line

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

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

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:

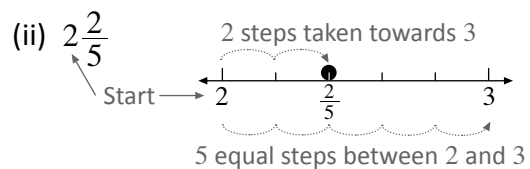
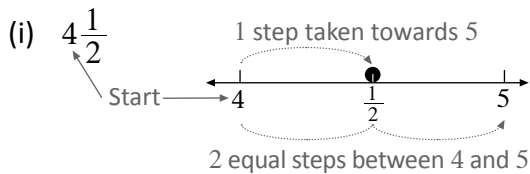


For mixed numerals, plot the fraction between the given whole number and the next whole number.

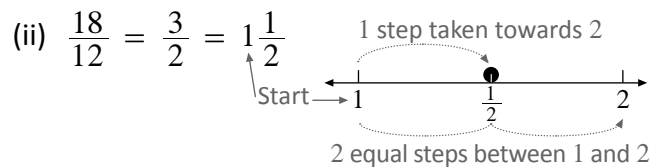
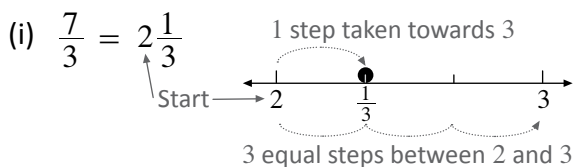
Start from this whole number $\rightarrow 3 \frac{1}{2}$ \leftarrow number of equal steps towards the next whole number '4'
 \leftarrow total number of equal steps between '3' and the next whole number '4'

Display and read these fractions on a number line:

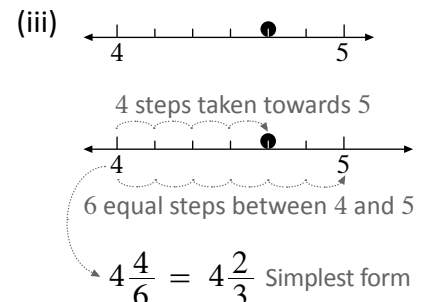
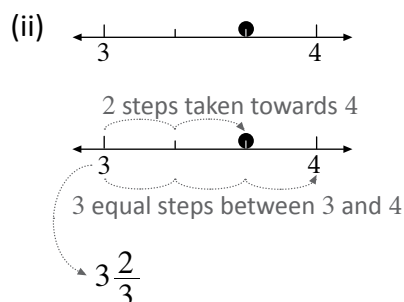
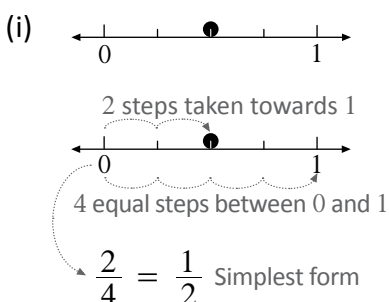
Mixed numerals



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



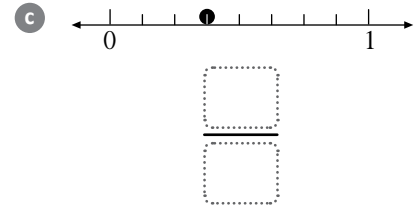
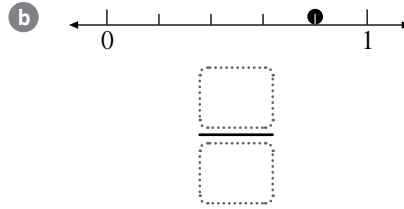
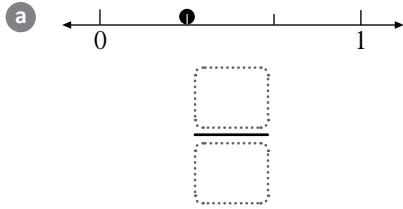
Write down the fraction displayed on these number lines



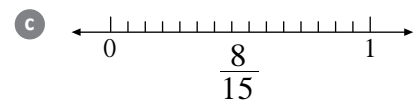
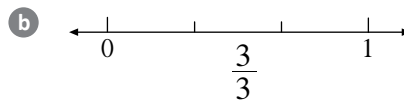
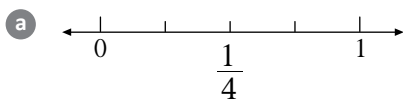


Fractions on the number line

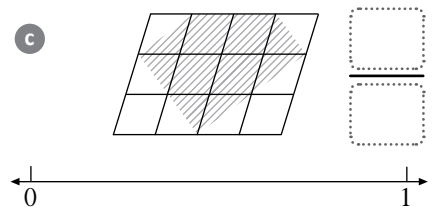
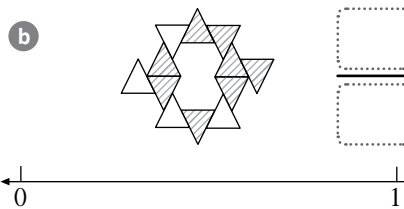
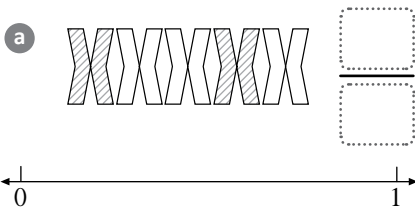
1 What proper fraction do the following points on the number line represent?



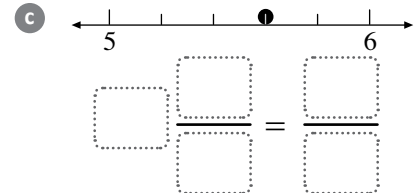
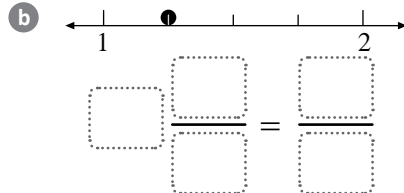
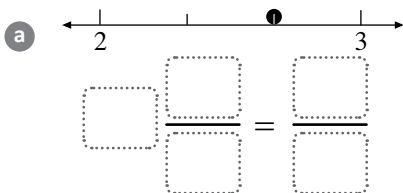
2 Display these fractions on a number line:



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



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



5 Display these improper fractions on the number line:

a

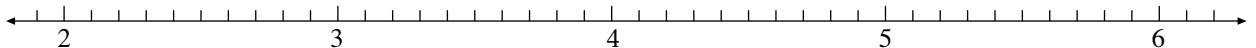
$$\frac{27}{10} = \boxed{} \frac{\boxed{}}{\boxed{}}$$

b

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

c

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



6 Display these on the number line after changing to equivalent fractions in simplest form first.

a

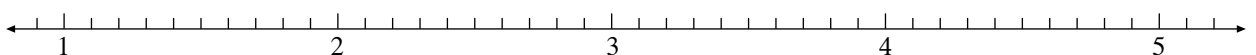
$$\frac{42}{15} = \frac{\boxed{}}{\boxed{}} = \boxed{} \frac{\boxed{}}{\boxed{}}$$

b

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

c

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



Mathletics



A 3P Learning Product