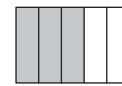


11. [Fractions]

Skill 11.1 Illustrating proper fractions.

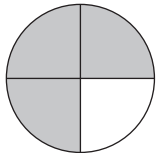
MM5 1 1 2 2 3 3 4 4
MM6 1 1 2 2 3 3 4 4

- Count the number of shaded parts.
- Count the total number of parts.
- Write the number of shaded parts over the total number of parts.



3 numerator - how many parts count
5 denominator - how many equal parts in one whole

Q. What fraction of the circle is shaded?



A. $\frac{3}{4}$

The circle is divided into 4 equal parts so the denominator of the fraction is 4. Only 3 parts of the circle are shaded so the numerator is 3.

The fraction of the circle that is shaded is three fourths or $\frac{3}{4}$.

a) What fraction of the bar is shaded?



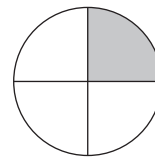
b) What fraction of the bar is shaded?



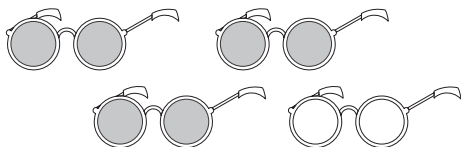
c) What fraction of the bar is shaded?



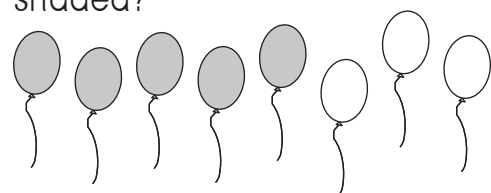
d) What fraction of the circle is shaded?



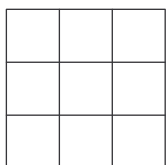
e) What fraction of the sunglasses is shaded?



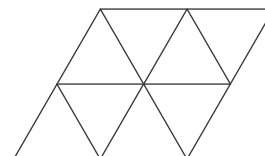
f) What fraction of the balloons is shaded?



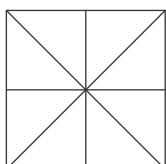
g) Shade in $\frac{4}{9}$ of the square.



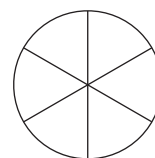
h) Shade in $\frac{3}{8}$ of the parallelogram.



i) Shade in $\frac{5}{8}$ of the square.

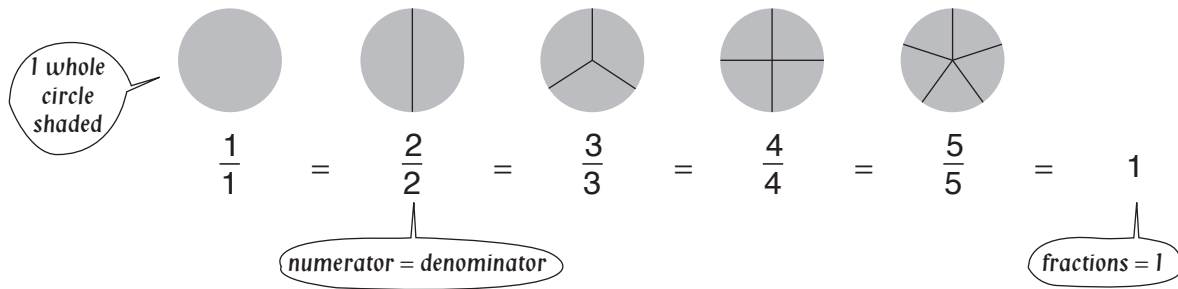


j) Shade in $\frac{1}{3}$ of one half of this circle.



Skill 11.2 Writing 1 as a fraction.

MM3.2 1 1 2 2 3 3 4 4
MM4.1 1 1 2 2 3 3 4 4



Q. Which of the following equal 1?

- A) $\frac{3}{3}$ B) $\frac{4}{3}$ C) $\frac{2}{3}$ D) $\frac{4}{4}$

A. A and D

The only fractions in which the numerator is the same as the denominator are $\frac{3}{3}$ and $\frac{4}{4}$
 $\frac{3}{3} = 1$ (three thirds make a whole)
 $\frac{4}{4} = 1$ (four fourths or quarters make a whole)

a) Which of the following equal 1?

- A) $\frac{3}{3}$ B) $\frac{1}{8}$ C) $\frac{8}{8}$ D) $\frac{3}{8}$

and

b) Which of the following equal 1?

- A) $\frac{5}{2}$ B) $\frac{2}{2}$ C) $\frac{1}{2}$ D) $\frac{5}{5}$

and

c) Write a fraction equal to 1 that has a denominator of 8.

d) Write a fraction equal to 1 that has a denominator of 7.

e) Write a fraction equal to 1 that has a denominator of 12.

f) Write a fraction equal to 1 that has a denominator of 9.

g) Three quarters of the lesson is over. What fraction of the lesson remains?

h) Luke has spent one sixth of his pocket money. What fraction of the money is left?

i) If one third of the birthday cake was eaten, what fraction of the cake remains?

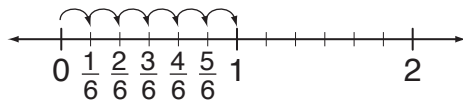
j) If three fifths of the show is over, what fraction of the performance is left?

Skill 11.3 Reading a fraction or a mixed number on a number line.

MM3.2 11 22 33 44
MM4.1 11 22 33 44

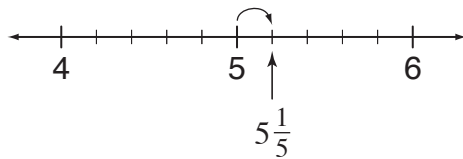
- Count the number of spaces between two consecutive whole numbers. The number of spaces tells you the value of the denominator.

Example: If there are 6 spaces between the whole numbers, then each space equals $\frac{1}{6}$.



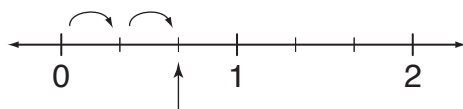
6 spaces \Rightarrow denominator $\frac{1}{6}$

- Q.** Name the mixed number shown by the arrow on the number line.



- A.** $5\frac{1}{5}$ There are five spaces between 5 and 6. Each space equals $\frac{1}{5}$. The arrow points to $5\frac{1}{5}$.

- a)** Name the fraction shown by the arrow on the number line.

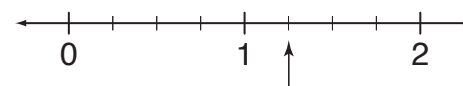


$\frac{2}{3}$

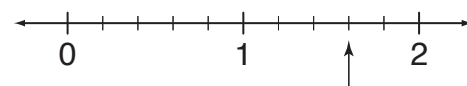
- b)** Name the fraction shown by the arrow on the number line.



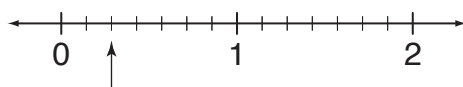
- c)** Name the mixed number shown by the arrow on the number line.



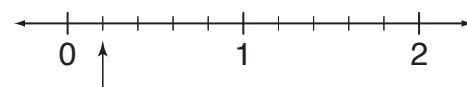
- d)** Name the mixed number shown by the arrow on the number line.



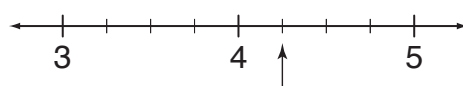
- e)** Name the fraction shown by the arrow on the number line.



- f)** Name the fraction shown by the arrow on the number line.

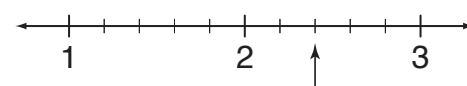


- g)** Name the mixed number shown by the arrow on the number line.



$4\frac{1}{4}$

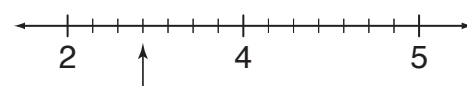
- h)** Name the mixed number shown by the arrow on the number line.



- i)** Name the mixed number shown by the arrow on the number line.



- j)** Name the mixed number shown by the arrow on the number line.



Skill 11.4 Adding fractions with the same denominators.

MM3.2 1 1 2 2 3 4 4
MM4.1 1 1 2 2 3 3 4 4

- Add the whole numbers first.
- Then add the numerators (top numbers of the fractions).
Don't change the denominators.

Q. $1\frac{1}{4} + 2\frac{2}{4} =$

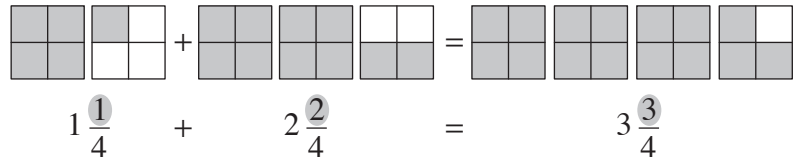
A. $3\frac{3}{4}$

Add the whole numbers first:

$$1 + 2 = 3$$

Add the fractions:

One fourth plus two fourths is three fourths. Add only the top numbers.



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

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

c) $\frac{2}{5} + \frac{2}{5} =$

d) $\frac{4}{9} + \frac{3}{9} =$

e) $\frac{1}{6} + \frac{4}{6} =$

f) $\frac{2}{4} + \frac{1}{4} =$

g) $\frac{1}{5} + \frac{3}{5} =$

h) $\frac{3}{8} + \frac{2}{8} =$

i) $\frac{2}{9} + \frac{2}{9} =$

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

k) $2\frac{2}{8} + 1\frac{5}{8} =$

l) $5\frac{3}{7} + 3\frac{2}{7} =$

m) $4\frac{1}{6} + 1\frac{4}{6} =$

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

o) $2\frac{2}{11} + 3\frac{5}{11} =$

p) $4\frac{5}{7} + 3\frac{1}{7} =$


q) $2\frac{2}{9} + 4\frac{3}{9} =$

r) $2\frac{3}{10} + 2\frac{4}{10} =$

Skill 11.5 Subtracting fractions with the same denominators.

MM3.2 1 1 2 2 3 3 4 4
MM4.1 1 1 2 2 3 3 4 4

- Subtract the whole numbers first.
Hint: You may need to convert 1 whole number to an equivalent fraction.

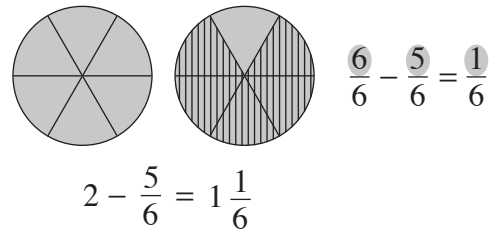
Example: $1 = \frac{5}{5}$ 

- Then subtract the numerators (top numbers of the fractions).
Don't change the denominators.

Q. $2 - \frac{5}{6} =$

A. $1\frac{1}{6}$

The two can be seen as one whole and six sixths.
Six sixths minus five sixths is one sixth.



a) $\frac{2}{3} - \frac{1}{3} =$

$\frac{1}{3}$

b) $\frac{4}{5} - \frac{1}{5} =$

c) $\frac{6}{9} - \frac{2}{9} =$

d) $\frac{6}{7} - \frac{3}{7} =$

e) $\frac{5}{8} - \frac{2}{8} =$

f) $\frac{3}{5} - \frac{2}{5} =$

g) $\frac{9}{10} - \frac{6}{10} =$

h) $\frac{8}{12} - \frac{3}{12} =$

i) $\frac{7}{11} - \frac{2}{11} =$

j) $2 - \frac{1}{3} =$

$1\frac{2}{3}$

k) $4 - \frac{1}{2} =$

l) $3 - \frac{2}{7} =$

m) $4 - \frac{2}{3} =$

n) $2 - \frac{1}{4} =$

o) $5 - \frac{3}{5} =$

p) $3 - \frac{5}{6} =$

q) $6 - \frac{4}{7} =$

r) $9 - \frac{5}{9} =$

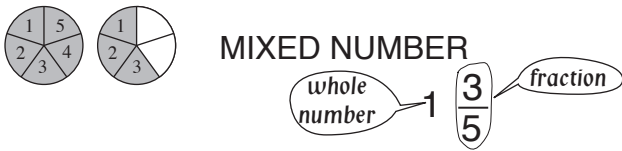
Recognising mixed numbers

To name the whole number:

- Count the fully shaded shapes.

To name the fraction:

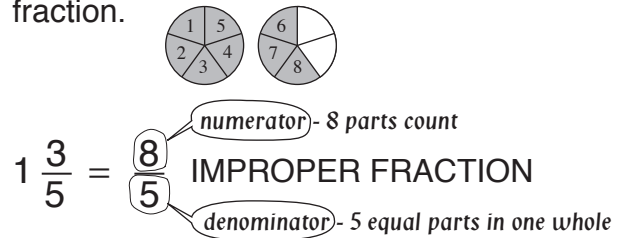
- Count the shaded parts of the last shape.
- Count the total parts of the last shape.
- Write the shaded parts over the total parts.



Illustrating mixed numbers

- Consider the mixed number as two bits:
A whole number.
A fraction.

- Shade the number of whole shapes to match the whole number.
- Partially shade the last shape to match the fraction.



Q. Shade the circles to show that $2\frac{1}{3} = \frac{7}{3}$



A. $2\frac{1}{3} = 1 + 1 + \frac{1}{3}$

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

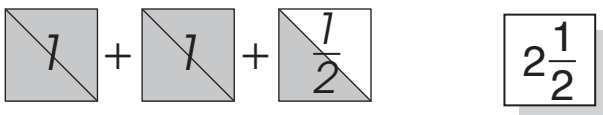
$$\frac{7}{3} = \frac{3}{3} + \frac{3}{3} + \frac{1}{3}$$

Shade two whole circles and a third of the remaining circle.

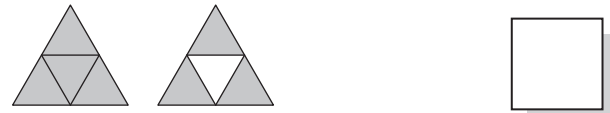
In total 7 thirds have been shaded.

This shows that $2\frac{1}{3} = \frac{7}{3}$

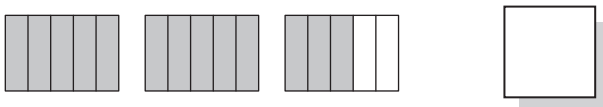
a) Name the mixed number represented by these shaded squares.



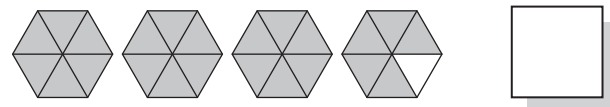
b) Name the mixed number represented by these shaded triangles.



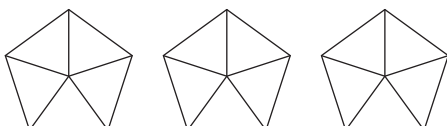
c) Name the mixed number represented by these shaded rectangles.



d) Name the mixed number represented by these shaded hexagons.



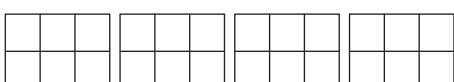
e) Shade the pentagons to show that $3 = \frac{15}{5}$



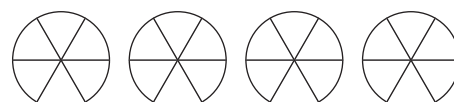
f) Shade the circles to show that $2\frac{2}{3} = \frac{8}{3}$

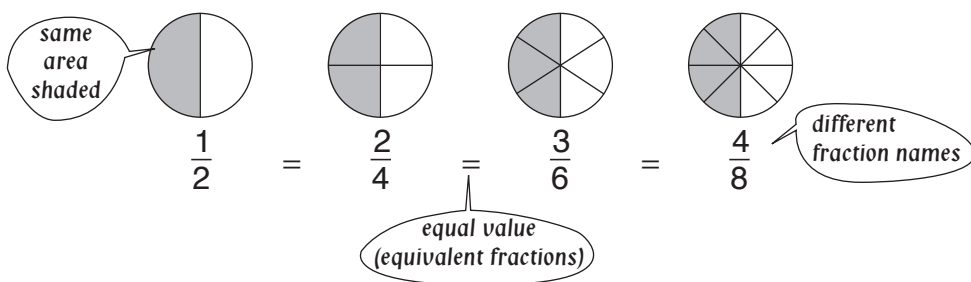


g) Shade the rectangles to show that $4 = \frac{24}{6}$



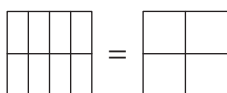
h) Shade the circles to show that $3\frac{1}{6} = \frac{19}{6}$





Q. Shade the diagrams to show

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



A.



Shade six eighths inside the first square.

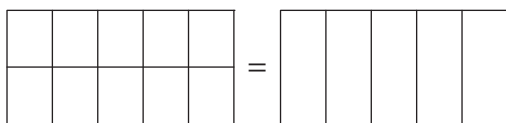
Shade three fourths inside the second square.

The same area of each square has been shaded.

This shows that $\frac{6}{8} = \frac{3}{4}$

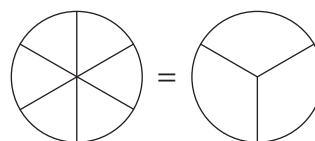
a) Shade the diagrams to show

$$\frac{8}{10} = \frac{4}{5}$$



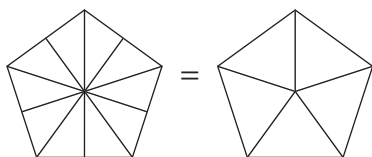
b) Shade the diagrams to show

$$\frac{4}{6} = \frac{2}{3}$$



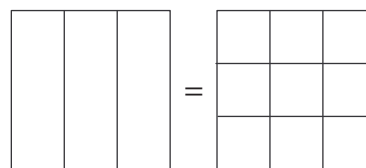
c) Shade the diagrams to show

$$\frac{4}{10} = \frac{2}{5}$$



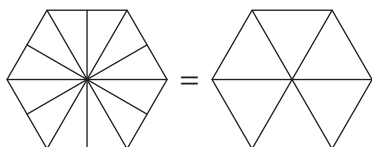
d) Shade the diagrams to show

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



e) Shade the diagrams to show

$$\frac{4}{12} = \frac{2}{6}$$



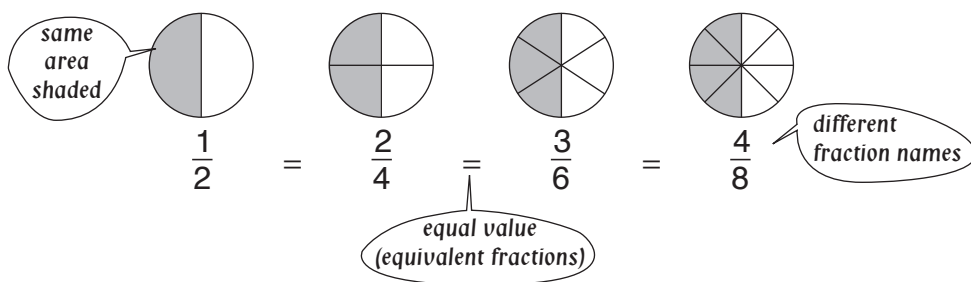
f) Shade the diagrams to show

$$\frac{12}{16} = \frac{3}{4}$$



Skill 11.8 Finding equivalent fractions.

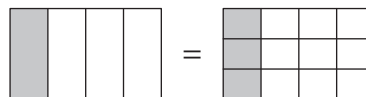
MM3.2 11 22 33 44
MM4.1 11 22 33 44



Q. Complete to form equivalent fractions:

$$\frac{1}{4} = \frac{\square}{12}$$

A. $\frac{1}{4} = \frac{3}{12}$



The rectangle on the left has 4 equal parts. Shade one part. The rectangle on the right has 12 equal parts. Shade the same area as in the first rectangle. Three out of twelve parts have been shaded. One fourth is the same as three twelfths.

$\frac{1}{4} = \frac{3}{12}$ are equivalent fractions.

a) Complete to form equivalent fractions:

$$\frac{4}{5} = \frac{16}{\square}$$

b) Complete to form equivalent fractions:

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

c) Complete to form equivalent fractions:

$$\frac{1}{3} = \frac{\square}{9}$$

d) Complete to form equivalent fractions:

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

e) Complete to form equivalent fractions:

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

f) Complete to form equivalent fractions:

$$\frac{4}{10} = \frac{\square}{5}$$

g) Complete to form equivalent fractions:

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

h) Complete to form equivalent fractions:

$$\frac{6}{12} = \frac{\square}{2}$$

i) Complete to form equivalent fractions:

$$\frac{4}{12} = \frac{\square}{3}$$

j) Complete to form equivalent fractions:

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

k) Complete to form equivalent fractions:

$$\frac{2}{3} = \frac{\square}{18}$$

l) Complete to form equivalent fractions:

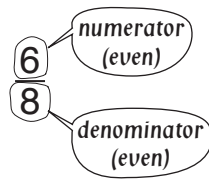
$$\frac{3}{10} = \frac{9}{\square}$$

Skill 11.9 Simplifying fractions.

MM3.2 11 22 33 44
MM4.1 11 22 33 44

- Decide if the fraction can be simplified.
If both numbers, top (numerator) and bottom (denominator), can be divided by the same number then the fraction can be simplified.

Hint: If the numbers are both even then you can start with dividing by 2.



- Divide both the numerator and the denominator by the same number.

$$\frac{6}{8} \stackrel{\div 2}{=} \frac{3}{4}$$

Q. Simplify $\frac{6}{10}$

A. $\frac{3}{5}$

Both 6 and 10 are even numbers.
They can be divided by 2.
The fraction can be simplified.

$$\frac{6}{10} = \frac{6 \div 2}{10 \div 2} = \frac{3}{5}$$

a) Simplify $\frac{12}{18}$

$$\frac{12 \div 6}{18 \div 6} = \frac{2}{3}$$

b) Simplify $\frac{4}{6}$

c) Simplify $\frac{9}{12}$

d) Simplify $\frac{5}{10}$

e) Simplify $\frac{6}{9}$

f) Simplify $\frac{8}{14}$

g) Simplify $\frac{3}{15}$

h) Simplify $\frac{8}{10}$

i) Simplify $\frac{6}{18}$

j) Simplify $\frac{4}{20}$

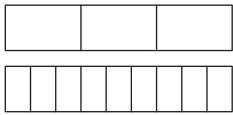
k) Simplify $\frac{10}{25}$

l) Simplify $\frac{20}{70}$

Skill 11.10 Comparing fractions.

- First shade each fraction on the identical shapes.
- Then compare the shaded areas to decide which is the largest.

Q. Shade the diagrams below to compare $\frac{2}{3}$ and $\frac{5}{9}$.
Which fraction is larger?

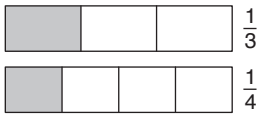


A. $\frac{2}{3}$



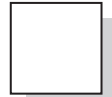
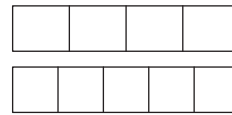
Shade two thirds of the first rectangle.
Shade five ninths of the second rectangle.
The fractions are close in value however $\frac{2}{3}$ is slightly greater than $\frac{5}{9}$.

a) Shade the diagrams below to compare $\frac{1}{3}$ and $\frac{1}{4}$.
Which fraction is larger?

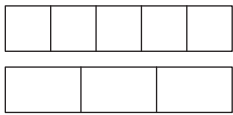


$\frac{1}{3}$

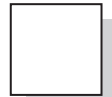
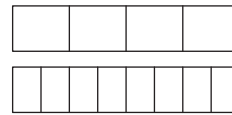
b) Shade the diagrams below to compare $\frac{3}{4}$ and $\frac{3}{5}$.
Which fraction is larger?



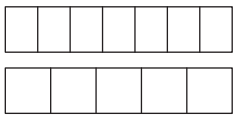
c) Shade the diagrams below to compare $\frac{2}{5}$ and $\frac{1}{3}$.
Which fraction is smaller?



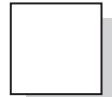
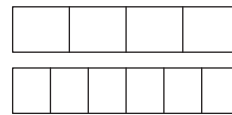
d) Shade the diagrams below to compare $\frac{3}{4}$ and $\frac{7}{8}$.
Which fraction is larger?



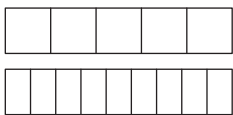
e) Shade the diagrams below to compare $\frac{4}{7}$ and $\frac{4}{5}$.
Which fraction is larger?



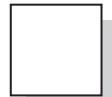
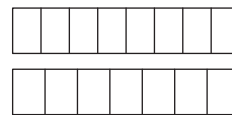
f) Shade the diagrams below to compare $\frac{3}{4}$ and $\frac{5}{6}$.
Which fraction is smaller?



e) Shade the diagrams below to compare $\frac{3}{5}$ and $\frac{5}{9}$.
Which fraction is larger?



f) Shade the diagrams below to compare $\frac{5}{8}$ and $\frac{4}{7}$.
Which fraction is smaller?



Skill 11.11 Finding a fraction of a whole number.

MM3.2 11 22 33 44
MM4.1 11 22 33 44

- First find one fraction of the number by dividing by the denominator.
- Then multiply the number of fractions you need by the result.

Example: Three fifths of 10?

First find one fifth of 10 by dividing 10 by 5.

$$10 \div 5 = 2$$

Then find three fifths of 10 by multiplying 3 by 2.

$$3 \times 2 = 6$$

So three fifths of 10 is 6.

Q. Eric kicked two thirds of his team's 12 goals. How many goals did he kick?

A. 8

Find one third of 12.

Divide 12 by 3.

$$12 \div 3 = 4$$

Find two thirds of 12.

Multiplying 2 by 4.

$$2 \times 4 = 8$$

a) Three fourths of the 28 students in the class are boys. How many boys are in the class?

one fourth of 28 = 28 ÷ 4 = 7

three fourths of 28 = 3 × 7 =

b) Two fifths of the 50 children at the nursery had the flu. How many children were ill?

one fifth of 50 =

two fifths of 50 =

c) Ian scored five eighths of the 40 points on the test. How many points did he score?

one eighth of 40 =

five eighths of 40 =

d) Of the 24 students in a class, one third are chosen for the school play. How many students are chosen for the play?

one third of 24 =

e) Five sixths of the 30 horses in the race jumped over the first hurdle. How many horses passed the first hurdle?

one sixth of 30 =

five sixths of 30 =

f) Of the 100 cakes at a party, seven tenths were eaten in the first hour. How many cakes were eaten in the first hour?

one tenth of 100 =

seven tenths of 100 =