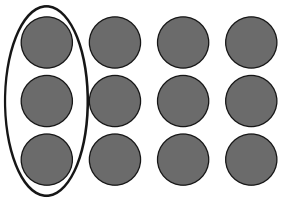
Working with fractions – fractions of a collection

Finding a fraction of different amounts is like division. Look at this array of dots. Finding one quarter is the same as dividing 12 by 4.

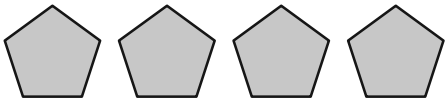


$12 \div 4 = 3$

$\frac{1}{4}$ of $12 = 3$

1 **Circle the fraction given for each group and complete the statements:**

a $\frac{1}{2}$ of 4 pentagons



$\square \div \square = \square$

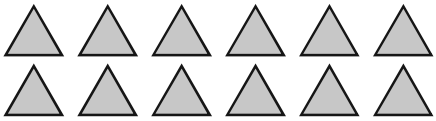
$\frac{1}{2}$ of $\square = \square$

b $\frac{1}{4}$ of 8 stars

$\square \div \square = \square$

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

c $\frac{1}{4}$ of 12 triangles

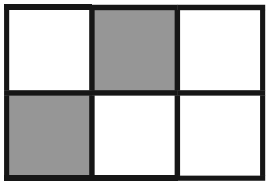


$\square \div \square = \square$

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

2 **Shade $\frac{1}{3}$ of these grids and complete the statements. The first one has been done for you.**

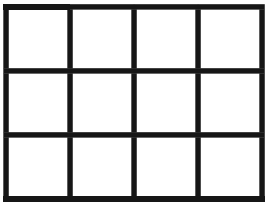
a



$6 \div 3 = 2$

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

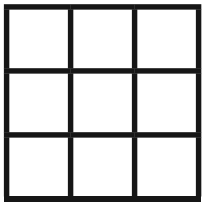
b



$\square \div \square = \square$

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

c



$\square \div \square = \square$

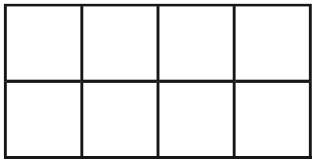
$\frac{1}{3}$ of $\square = \square$

page 1

Working with fractions – fractions of a collection

3 **Shade $\frac{1}{4}$ on these grids and complete the statements:**

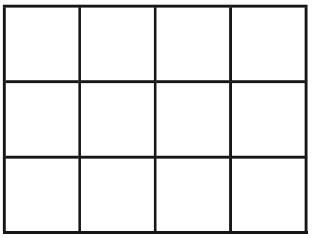
a



□ ÷ □ = □

$\frac{1}{4}$ of □ = □

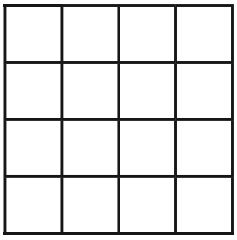
b



□ ÷ □ = □

$\frac{1}{4}$ of □ = □

c



□ ÷ □ = □

$\frac{1}{4}$ of □ = □

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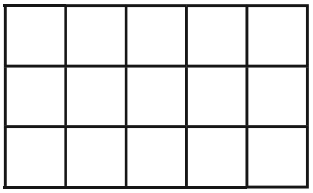
4 **Shade $\frac{1}{5}$ on these grids and complete the statements:**

a

□ ÷ □ = □

$\frac{1}{5}$ of □ = □

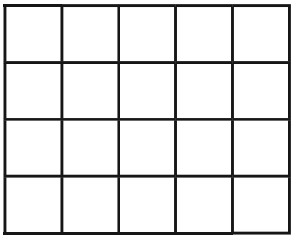
b



□ ÷ □ = □

$\frac{1}{5}$ of □ = □

c



□ ÷ □ = □

$\frac{1}{5}$ of □ = □

---

5 **Find the fractions of these numbers:**

a $\frac{1}{2}$ of 8 = □

b $\frac{1}{4}$ of 12 = □

c $\frac{1}{3}$ of 9 = □

d $\frac{1}{5}$ of 15 = □

e $\frac{1}{8}$ of 16 = □

f $\frac{1}{4}$ of 20 = □

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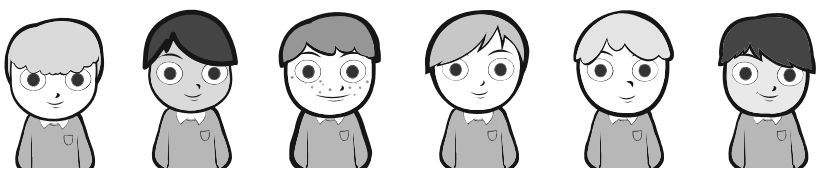
6 **Complete this picture to show that $\frac{2}{3}$ of these boys are wearing hats:**

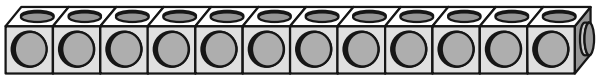


Working with fractions – fractions of a collection

Josie connected 12 cubes. $\frac{1}{4}$ were red, $\frac{1}{4}$ were yellow and the rest were blue. What fraction of the whole were blue?

$\frac{6}{12}$ or $\frac{1}{2}$

Red: $\frac{1}{4}$ of 12 = 3 Yellow: $\frac{1}{4}$ of 12 = 3 Blue = 6



R R R Y Y Y B B B B B B

7 **Answer these cube problems:**

a Amy connected 8 cubes. $\frac{1}{2}$ were green, $\frac{1}{4}$ were red and the rest were blue.

How many were blue? ☐ Green: $\frac{1}{2}$ of 8 = ☐ Red: $\frac{1}{4}$ of 8 = ☐

b Joel connected 16 cubes. $\frac{1}{2}$ were blue, $\frac{1}{4}$ were orange and the rest were purple.

How many were purple? ☐ Blue: $\frac{1}{2}$ of 16 = ☐ Orange: $\frac{1}{4}$ of 16 = ☐

c Natalie connected 20 cubes. $\frac{1}{4}$ were yellow, $\frac{1}{5}$ were green and the rest were orange.

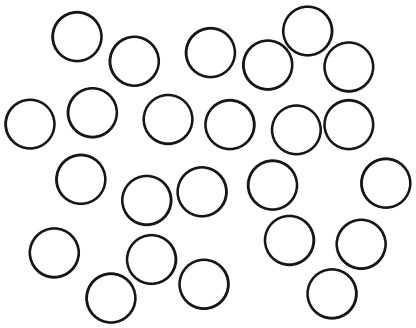
How many were orange? ☐ Yellow: $\frac{1}{4}$ of 20 = ☐ Green: $\frac{1}{5}$ of 20 = ☐

8 **Amber scattered a packet of 24 Smarties on her desk to see how many blue ones there were. Below is a list of what was in the packet. Shade them as shown:**

a $\frac{1}{4}$ were red = ☐ **b** $\frac{1}{8}$ were pink = ☐

c $\frac{1}{3}$ were yellow = ☐ **d** $\frac{1}{6}$ were green = ☐

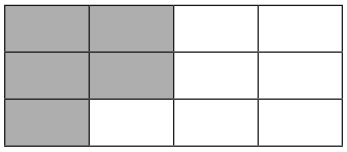
e The rest were blue. How many were blue? ☐



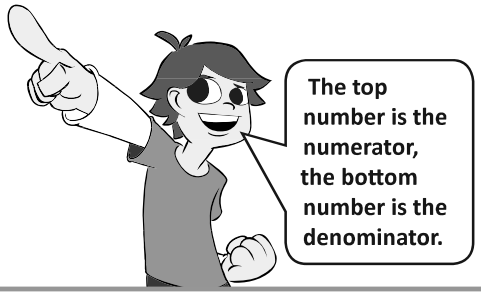
page 3

Fractions – fractions of shapes

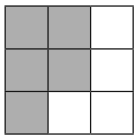
A fraction is a part of a whole.
This shape has 12 equal parts. 5 of these have been shaded.

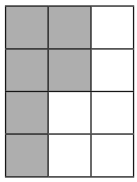


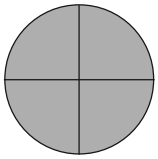
$$\frac{5}{12} = \frac{\text{5 shaded parts}}{\text{12 parts altogether}}$$

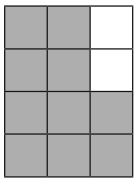


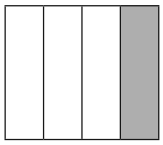
1 **What fraction of each shape has been shaded?**

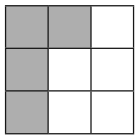
a $\frac{\square}{9}$ 

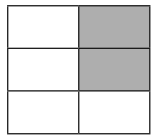
b $\frac{\square}{\square}$ 

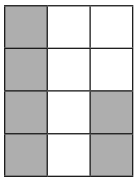
c $\frac{\square}{\square}$ 

d $\frac{\square}{\square}$ 

e $\frac{\square}{\square}$ 

f $\frac{\square}{\square}$ 

g $\frac{\square}{\square}$ 

h $\frac{\square}{\square}$ 

2 **Answer the following questions about the shapes above:**

a What part of **a** is **unshaded**? $\frac{\square}{\square}$

b What fraction of **e** is **unshaded**? $\frac{\square}{\square}$

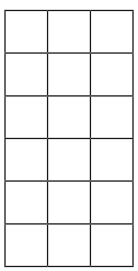
c In **f**, is more of the shape shaded or unshaded? _____

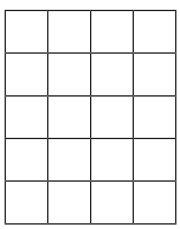
d What fraction of **b** is **unshaded**? $\frac{\square}{\square}$

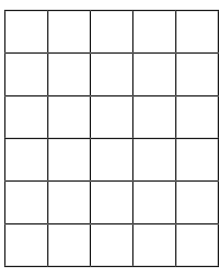
e Look at shape **h**. What can you say about the amount of shaded and unshaded parts?

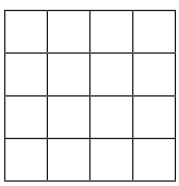
_____

3 **Shade the given fraction for each shape:**

a $\frac{8}{18}$ 

b $\frac{17}{20}$ 

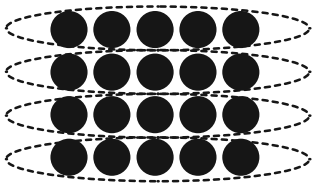
c $\frac{12}{30}$ 

d $\frac{12}{16}$ 

page 4

Fractions – fractions of a collection

There is another way to find fractions of amounts:
What is $\frac{1}{4}$ of 20?
20 divided into 4 groups is 5 in each group
20 ÷ 4 = 5



4 **Find the fractional amounts. You can use blocks or counters to help or solve the problems in your head using division:**

a $\frac{1}{5}$ of 20 = ☐
20 ÷ ___ = ☐

b $\frac{1}{4}$ of 12 = ☐
12 ÷ ___ = ☐

c $\frac{1}{3}$ of 18 = ☐
18 ÷ ___ = ☐

d $\frac{1}{6}$ of 18 = ☐
18 ÷ ___ = ☐

e $\frac{1}{5}$ of 15 = ☐
___ ÷ ___ = ☐

f $\frac{1}{9}$ of 27 = ☐
___ ÷ ___ = ☐

g $\frac{1}{2}$ of 14 = ☐
___ ÷ ___ = ☐

h $\frac{1}{7}$ of 21 = ☐
___ ÷ ___ = ☐

Once we know how to find one part of a group, we can use this to find other amounts:

To find $\frac{2}{3}$ of 9, we first find $\frac{1}{3}$ of 9 → 9 ÷ 3 = 3 $\frac{1}{3}$ of 9 = 3

$\frac{2}{3}$ of 9 is 2 times this → 2 × 3 = 6 $\frac{2}{3}$ of 9 = 6

5 **Find the fractional amounts. Use the space below to work out the different steps:**

a What is $\frac{2}{5}$ of 20?
20 ÷ 5 = ☐
2 × _____ = ☐
$\frac{2}{5}$ × 20 = ☐

b What is $\frac{3}{4}$ of 12?
12 ÷ 4 = ☐
3 × _____ = ☐
$\frac{3}{4}$ × 12 = ☐

c What is $\frac{2}{3}$ of 18?
18 ÷ 3 = ☐
2 × _____ = ☐
$\frac{2}{3}$ × 18 = ☐

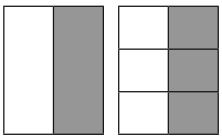
d What is $\frac{3}{4}$ of 16?
16 ÷ 4 = ☐
3 × _____ = ☐
$\frac{3}{4}$ × 16 = ☐

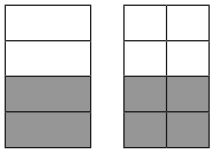
e What is $\frac{2}{8}$ of 24?
24 ÷ 8 = ☐
2 × _____ = ☐
$\frac{2}{8}$ × 24 = ☐

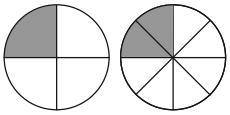
f What is $\frac{2}{7}$ of 14?
14 ÷ 7 = ☐
2 × _____ = ☐
$\frac{2}{7}$ × 14 = ☐

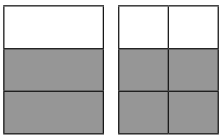
Types of fractions – equivalent fractions

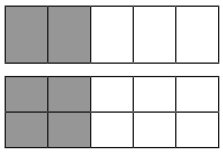
3 **Write the equivalent fraction for each of these:**

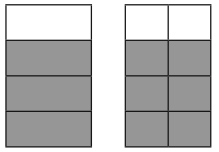
a  $\frac{1}{2} = \frac{\square}{6}$

b  $\frac{2}{4} = \frac{\square}{8}$

c  $\frac{1}{4} = \frac{\square}{8}$

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

e  $\frac{2}{5} = \frac{\square}{10}$

f  $\frac{3}{4} = \frac{\square}{8}$

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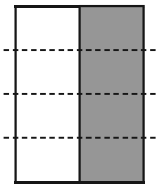
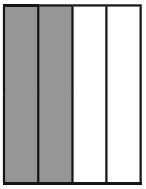
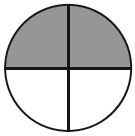
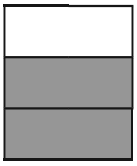
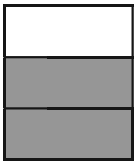
4 **Find an equivalent fraction for each of these. Divide the diagrams to create a different number of equal parts. The first one has been done for you.**

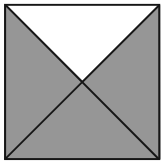
a  $\frac{1}{2} = \frac{4}{8}$

b  $\frac{2}{4} = \frac{\square}{\square}$

c  $\frac{2}{4} = \frac{\square}{\square}$

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

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

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

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5 **Is $\frac{2}{8}$ equivalent to $\frac{1}{4}$? Use diagrams to help explain your reasoning:**

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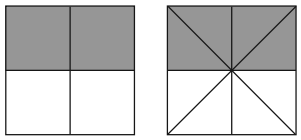
6 **Is $\frac{2}{3}$ equivalent to $\frac{5}{6}$? Use diagrams to help explain your reasoning:**

Types of fractions – equivalent fractions

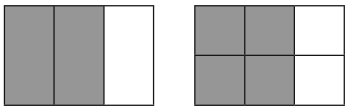
7 **This section has been completed by our work experience boy. How did he go? Give him some feedback:**

a



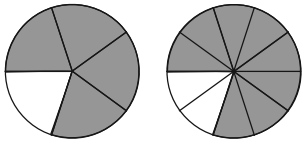
$\frac{2}{4} = \frac{4}{8}$

b



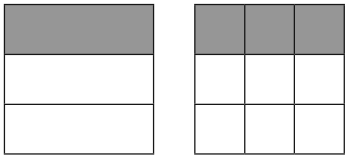
$\frac{2}{3} = \frac{4}{3}$

c



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

d

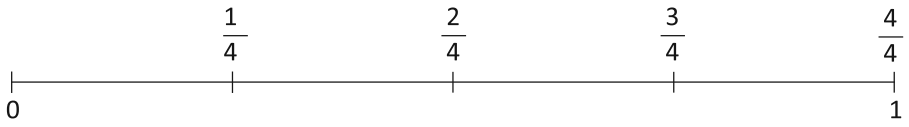


$\frac{1}{3} = \frac{3}{6}$

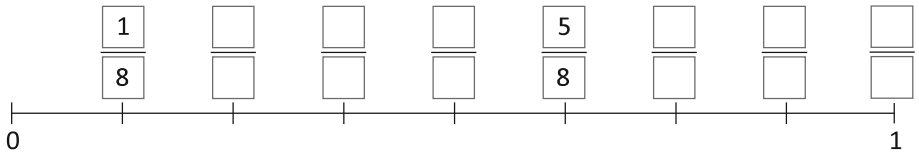
Your feedback:

8 **Complete the number lines. The first has been done for you:**

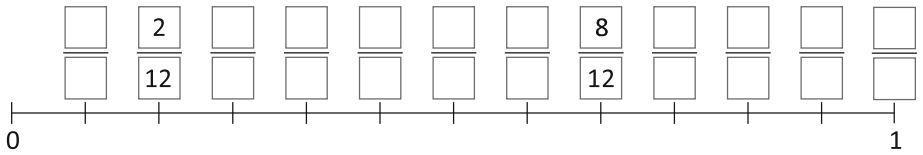
a



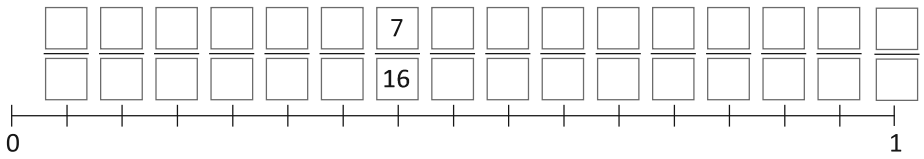
b



c



d



9 **Use the number lines to answer the following:**

a How many equivalent fractions can you find for $\frac{1}{4}$?

b Did you find a pattern? Can you continue it?

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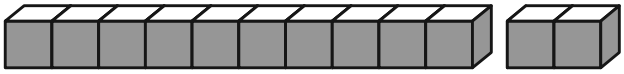
Types of fractions – mixed numerals

A mixed numeral is a whole number and a fraction. For example, say we connected 10 multilink cubes and named this as 1 whole.

= 1

If we then picked up 2 more multilink cubes we have another 2 tenths.

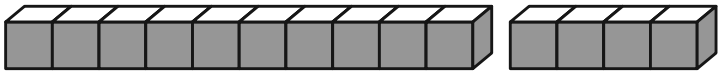
$= \frac{2}{10}$



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

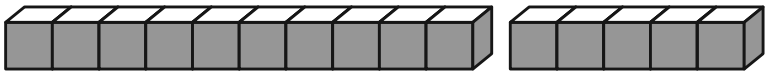
1 **In each of these problems, 10 multilink cubes represent 1 whole. Write the mixed numeral for each set of multilink cubes.**

a



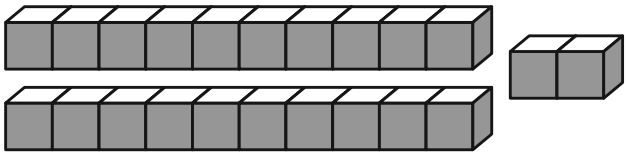
= ☐ ☐/☐

b



= ☐ ☐/☐

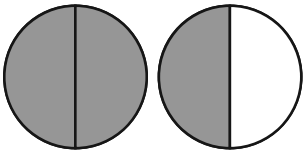
c



= ☐ ☐/☐

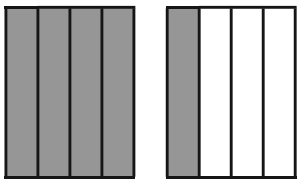
2 **Write the mixed numerals that these fraction models are showing:**

a



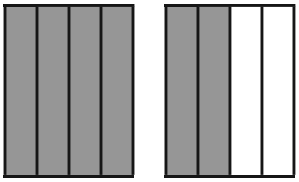
= ☐ ☐/☐

b



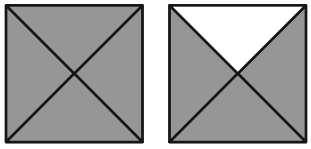
= ☐ ☐/☐

c



= ☐ ☐/☐

d



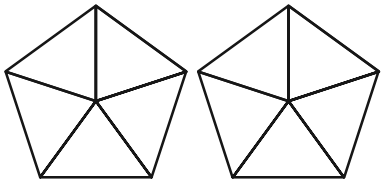
= ☐ ☐/☐

page 8

Types of fractions – mixed numerals

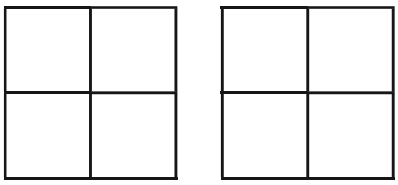
3 **Shade these fraction models to show the mixed numerals:**

a



$1\frac{2}{5}$

b

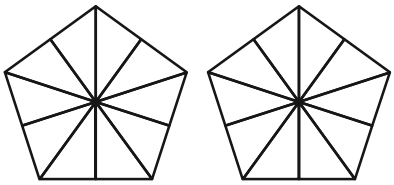


$1\frac{3}{4}$

c

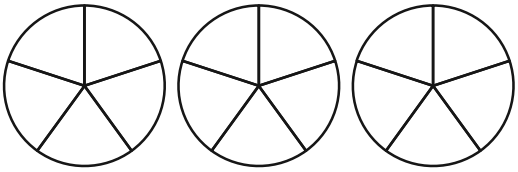
$2\frac{2}{3}$

d



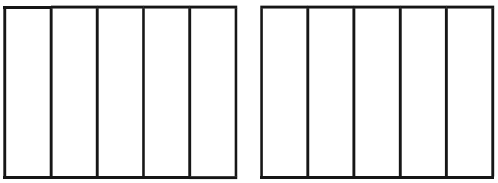
$1\frac{4}{10}$

e



$2\frac{4}{5}$

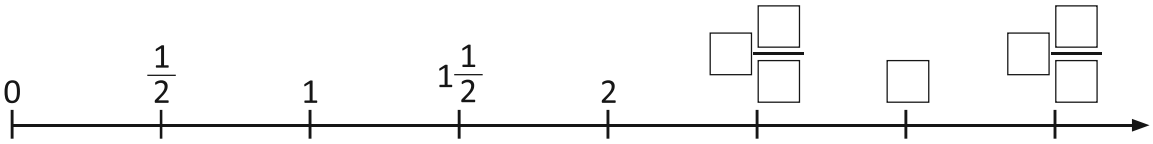
f



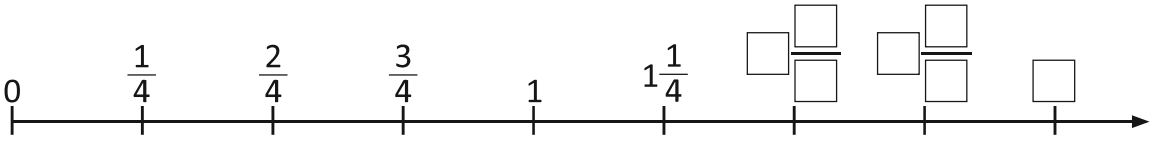
$1\frac{3}{5}$

4 **Complete these number lines:**

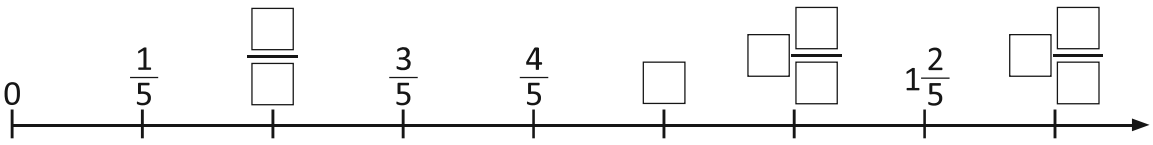
a



b



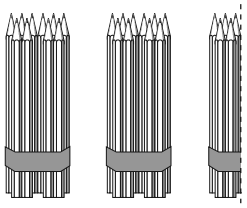
c



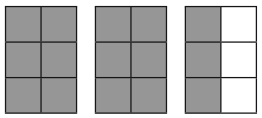
Types of fractions – mixed numerals and improper fractions

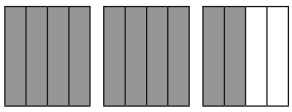
Mixed numerals consist of both a whole number and a fraction.
Ky has 2 full packets of pencils and one half packet of pencils.

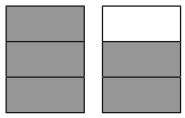
This is shown as $2\frac{1}{2}$

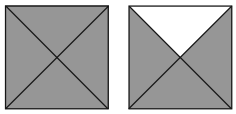


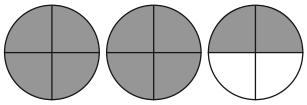
1 **Write a mixed numeral for each of the shaded sets of shapes:**

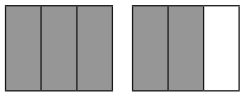
a  = ☐ ☐/☐

b  = ☐ ☐/☐

c  = ☐ ☐/☐

d  = ☐ ☐/☐

e  = ☐ ☐/☐

f  = ☐ ☐/☐

2 **Draw some diagrams or pictures that would represent:**

a

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

b

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

c

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

d

3 and $\frac{3}{4}$

3 **What might the missing numbers be?**

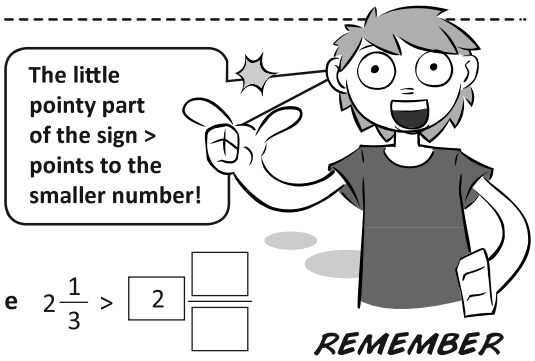
a $1\frac{1}{2} > \boxed{1}\ \frac{\square}{4}$

b $3\frac{1}{3} < \square\ \frac{\square}{\square}$

c $1\frac{1}{5} < \boxed{1}\ \frac{\square}{\square}$

d $2\frac{3}{6} > \boxed{2}\ \frac{\square}{\square}$

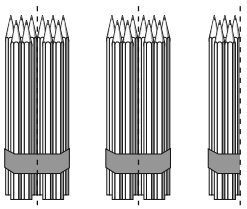
e $2\frac{1}{3} > \boxed{2}\ \frac{\square}{\square}$



Types of fractions – mixed numerals and improper fractions

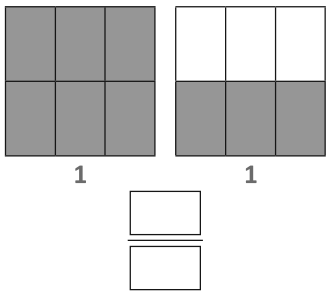
Mixed numerals can also be written as improper fractions.
Look again at Ky's full packets and one half packet of pencils.
This is five halves.

Written as an improper fraction, this is $\frac{5}{2}$.

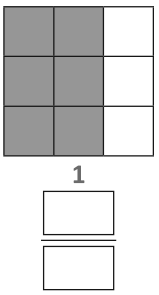


4 **Express these as fractions. Circle any improper fractions:**

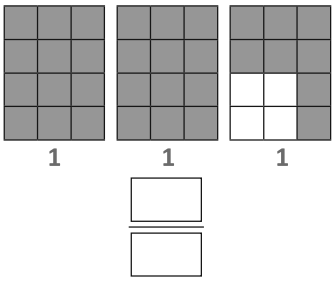
a



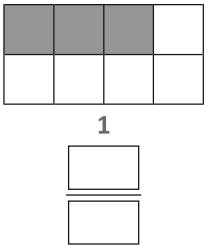
b



c

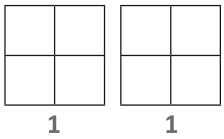


d

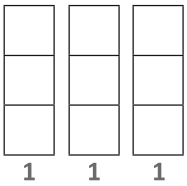


5 **Colour the shapes to create the following improper fractions. Remember each shape is one whole.**

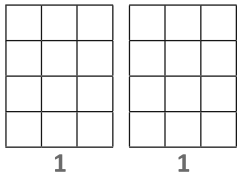
a $\frac{5}{4}$



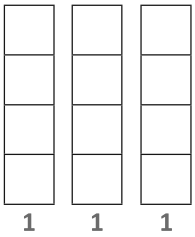
b $\frac{7}{3}$



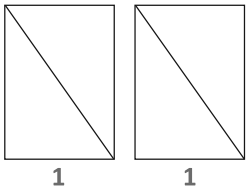
c $\frac{17}{12}$



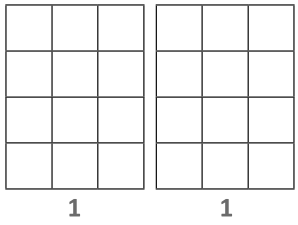
d $\frac{11}{4}$



e $\frac{3}{2}$



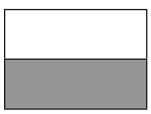
f $\frac{20}{12}$



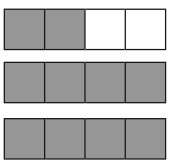
6 **Which is bigger? Circle the larger fraction:**

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

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

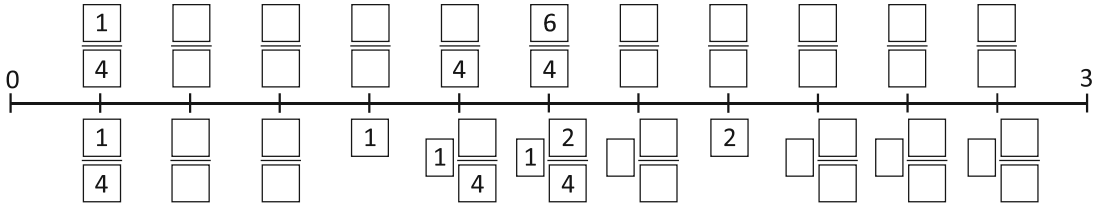


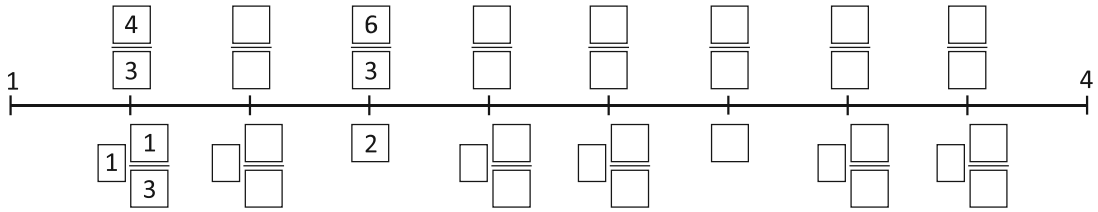
c $\frac{9}{4}$ or



Types of fractions – mixed numerals and improper fractions

7 **Complete the number lines by filling in the boxes:**

a 

b 

8 **Use your completed number lines to help you answer these questions:**

a What is $2\frac{1}{4}$ expressed as an improper fraction? $\frac{\square}{\square}$

b Write $\frac{13}{11}$ as a mixed number. $\square\frac{\square}{\square}$

c Find an improper fraction that is greater than $1\frac{1}{3}$ but less than $\frac{10}{3}$. $\frac{\square}{\square}$

d Your teacher offers you the choice between $\frac{10}{4}$ or $2\frac{1}{4}$ hours of rubbish duty. Are they doing you any favours?

9 **Show the improper fractions. The number line at the top of the page will help:**

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

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

c $2\frac{1}{4} = \frac{\square}{4}$

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

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

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

g $\frac{6}{4} = \square\frac{\square}{\square}$

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

i $\frac{\square}{\square} = 2\frac{3}{4}$

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