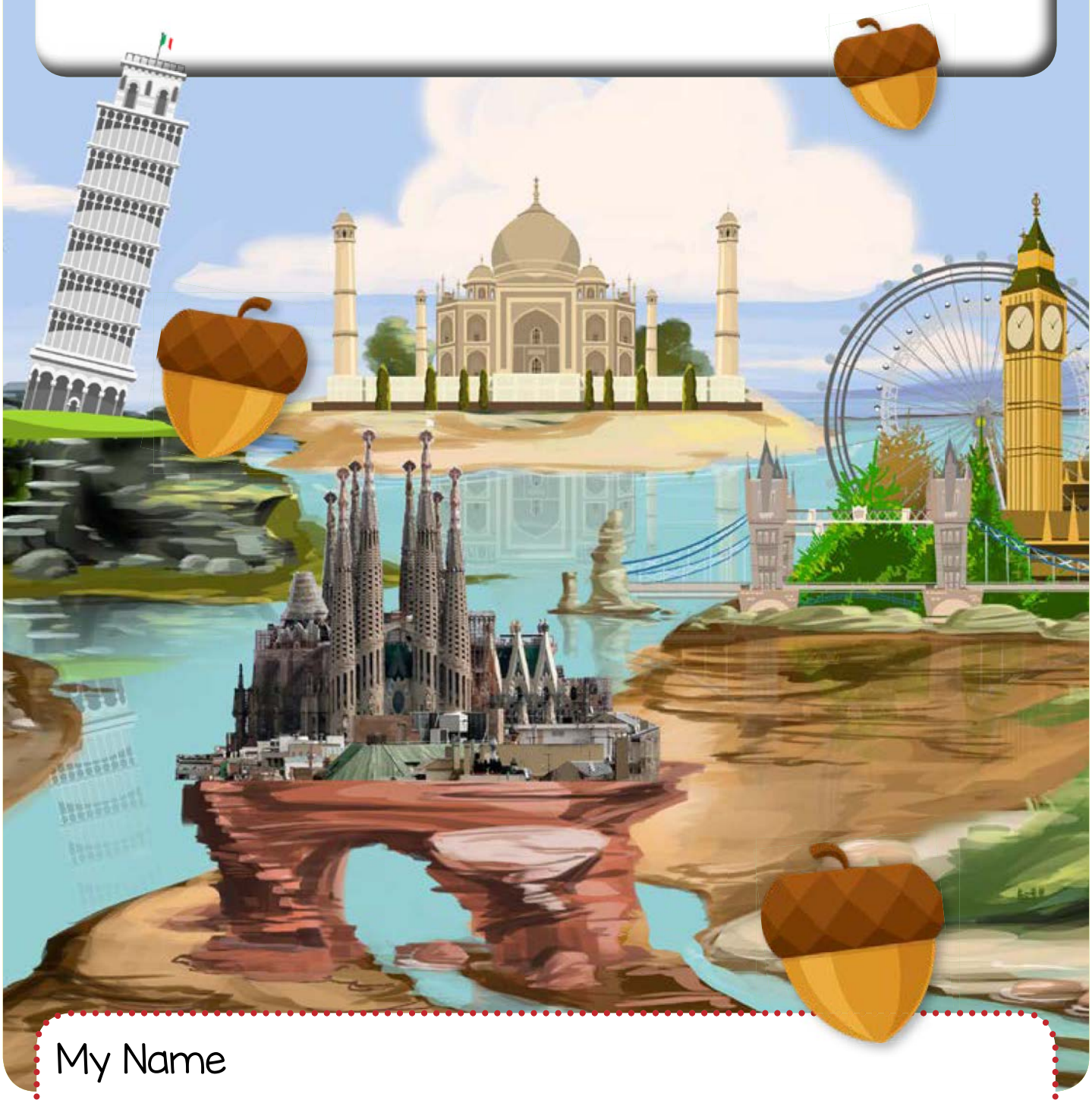
YEAR 3 STUDENT BOOK

Mathseeds

Fractions



My Name

www.mathseeds.com.au

Mathseeds Fractions Year 3 Student Book

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Contents

Topic 1: Fractions to 1

Topic 2: Fractions over 1

Resources

In this book

The **Mathseeds** program teaches children the core maths and problem solving skills needed to be successful at school.

Each online lesson begins by introducing and modelling a mathematical concept. The child then completes a wide range of activities where they practise the new skill. These activities present the content in many different ways so that children learn to use and apply each new skill in a variety of situations.

This book is designed to supplement the online program with more exercises in the core mathematical concepts. Each unit focuses on a topic within the main learning strand, presenting a series of pen and paper activities, word problems, puzzles and games to practise their skills and understanding.

The topics in this book align with the following components of the Australian Curriculum:

Australian Curriculum content codes and descriptions

ACMNA058 - Model and represent unit fractions including $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{5}$ and their multiples to a complete whole

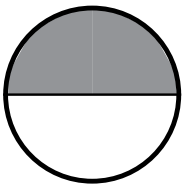
ACMNA078 - Count by quarters halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line

Unit fractions

Unit fractions are 1 part of an equally divided shape.

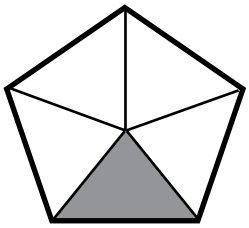
Unit fractions have a numerator of 1 for 1 part: $\frac{1}{2}$

The denominator tells us how many parts in total:



1 Match.

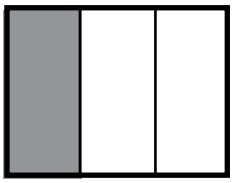
a



$\frac{1}{2}$

one third

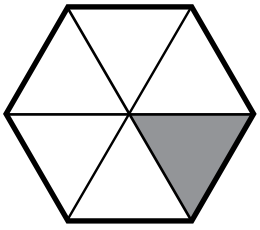
b



$\frac{1}{3}$

one sixth

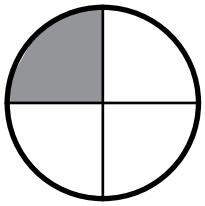
c



$\frac{1}{4}$

one half

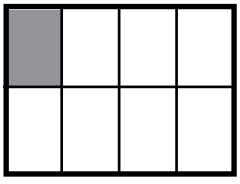
d



$\frac{1}{5}$

one eighth

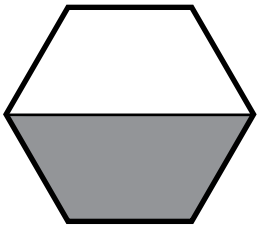
e



$\frac{1}{6}$

one quarter

f



$\frac{1}{8}$

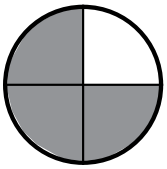
one fifth

Unit fraction multiples

Fractions can refer to more than 1 part of an equally divided shape.

The numerator tells us how many parts in the fraction. The denominator tells us how many parts in total.

numerator ↓ $\frac{3}{4}$ ↑ denominator



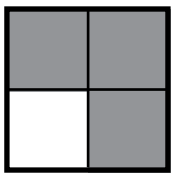
1 Colour the fractions.

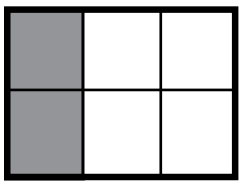
a $\frac{1}{4}$ red, $\frac{2}{4}$ yellow, $\frac{1}{4}$ green

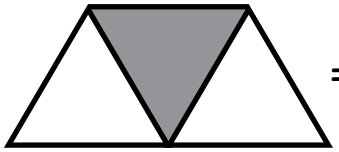
b $\frac{2}{5}$ blue, $\frac{3}{5}$ purple

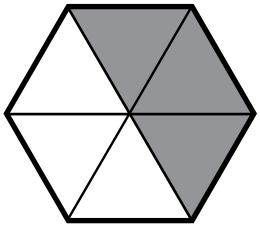
c $\frac{2}{6}$ yellow, $\frac{2}{6}$ green, $\frac{1}{6}$ pink, $\frac{1}{6}$ blue

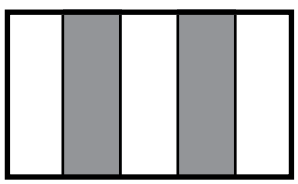
2 Write the fractions.

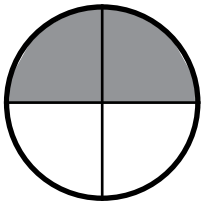
a  = $\frac{\square}{\square}$

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

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

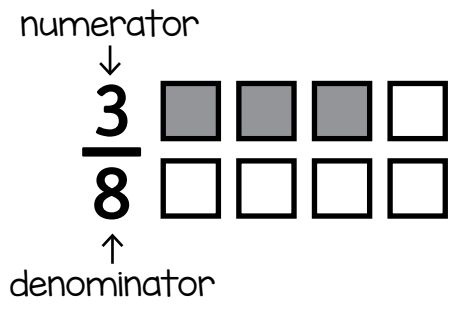
d  = $\frac{\square}{\square}$

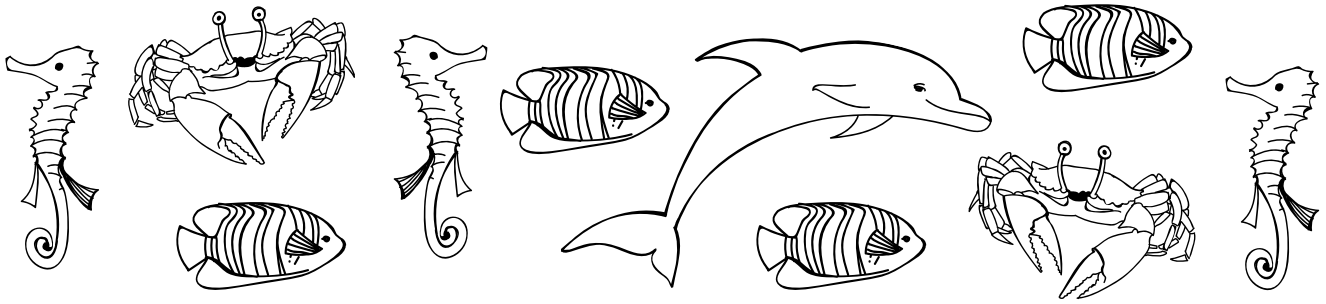
e  = $\frac{\square}{\square}$

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

Fractions of collections

Fractions can refer to a share of a collection. The numerator tells us how many items in the share. The denominator tells us how many items in total.





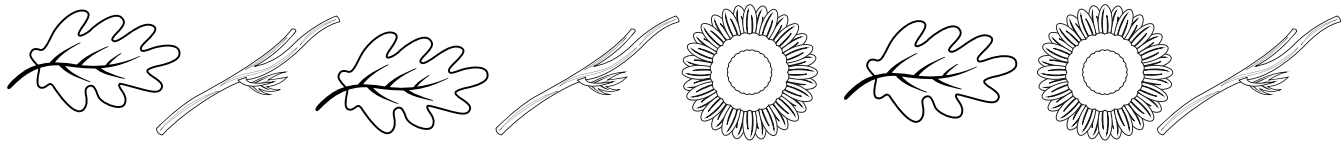
1 **a** How many sea creatures are in this group? ____

b How many crabs? ____ **c** How many fish? ____

d How many seahorses? ____ **e** How many dolphins? ____

2 What fraction of the group are

a crabs? $\frac{\square}{\square}$ **b** fish? $\frac{\square}{\square}$ **c** seahorses? $\frac{\square}{\square}$ **d** dolphins? $\frac{\square}{\square}$



3 What fraction of the group are

a flowers? $\frac{\square}{\square}$ **b** sticks? $\frac{\square}{\square}$ **c** leaves? $\frac{\square}{\square}$

4 What fraction of the group are

a oranges? $\frac{\square}{\square}$ **b** apples? $\frac{\square}{\square}$ **c** pears? $\frac{\square}{\square}$

Sharing and fractions

1 Draw a diagram to share the items equally.
2 What fraction of the collection does each person get?

a 2 people sharing 8 balloons.

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

b 3 people sharing 9 party hats.

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

c 4 people sharing 12 cupcakes.

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

d 5 people sharing 10 cups.

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

Fraction number lines

1 Put these in order from smallest to largest.

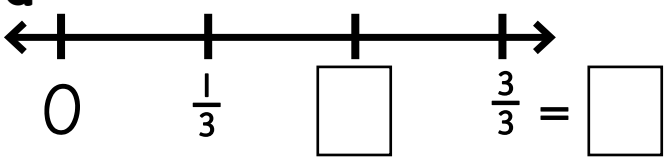
a $\frac{1}{5}, \frac{2}{5}, \frac{4}{5}, \frac{3}{5}, \frac{5}{5}$ _____

b $\frac{6}{6}, \frac{1}{6}, \frac{3}{6}, \frac{5}{6}, \frac{4}{6}, \frac{2}{6}$ _____

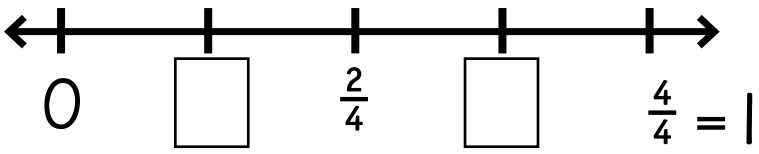
c $1, \frac{3}{8}, \frac{2}{8}, \frac{7}{8}, \frac{4}{8}, \frac{1}{8}, \frac{5}{8}, \frac{6}{8}$ _____

2 Fill in the fraction number lines.

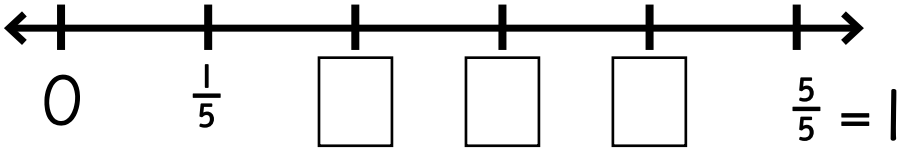
a



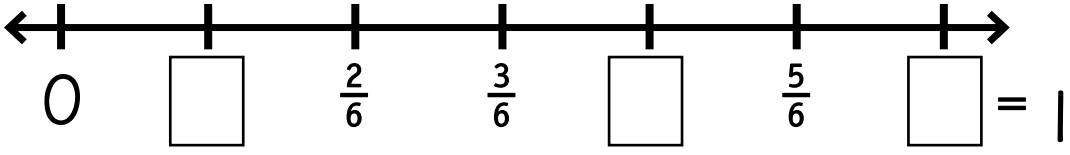
b



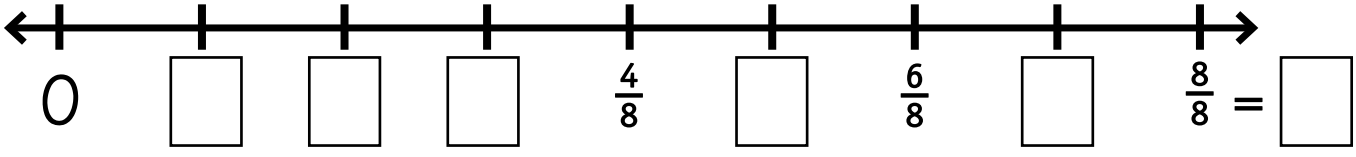
c



d



e



3 Put these in order from smallest to largest.

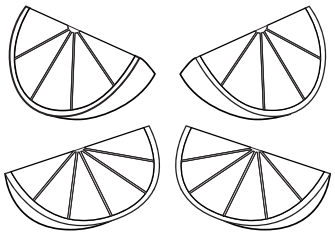
$\frac{1}{5}, \frac{1}{2}, \frac{1}{6}, \frac{1}{4}, \frac{1}{8}, \frac{1}{3}$ _____

Compare fractions

Compare the numerators in fractions with the same denominator: $\frac{4}{8} < \frac{7}{8}$

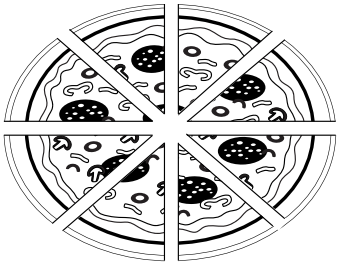
1 Circle the larger fraction. Colour that fraction of the food.

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

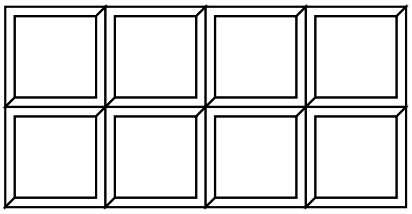


b $\frac{1}{3}$ $\frac{2}{3}$

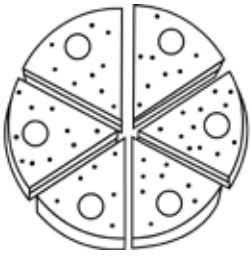
c $\frac{6}{8}$ $\frac{2}{8}$



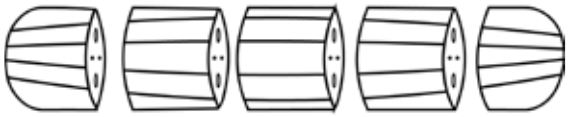
d $\frac{5}{8}$ $\frac{3}{8}$



e $\frac{4}{6}$ $\frac{2}{6}$



f $\frac{3}{5}$ $\frac{2}{5}$



2 Use the correct symbol: **<** or **>**.

a $\frac{1}{2}$ ☐ $\frac{1}{4}$ **b** $\frac{3}{4}$ ☐ $\frac{1}{4}$ **c** $\frac{2}{3}$ ☐ $\frac{1}{3}$

d $\frac{1}{5}$ ☐ $\frac{4}{5}$ **e** $\frac{5}{6}$ ☐ $\frac{1}{6}$ **f** $\frac{1}{8}$ ☐ $\frac{7}{8}$

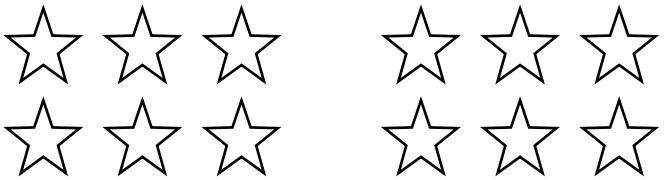
g $\frac{2}{8}$ ☐ $\frac{5}{8}$ **h** $\frac{2}{4}$ ☐ $\frac{3}{4}$ **i** $\frac{3}{5}$ ☐ $\frac{4}{5}$

Compare fractions of collections

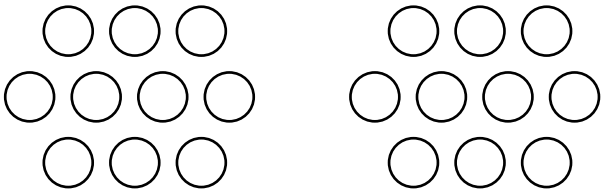
1 Colour each fraction of the collection.

2 Write the correct symbol in the box: **>** or **<**.

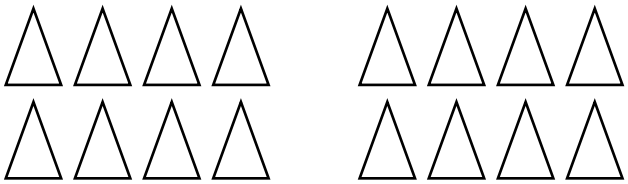
a $\frac{3}{6}$ ☐ $\frac{5}{6}$



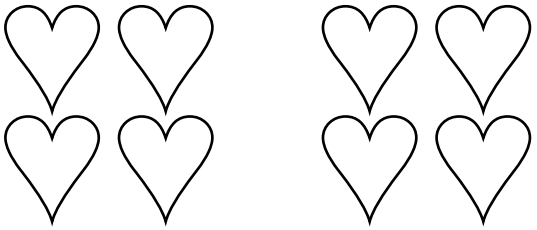
b $\frac{9}{10}$ ☐ $\frac{6}{10}$



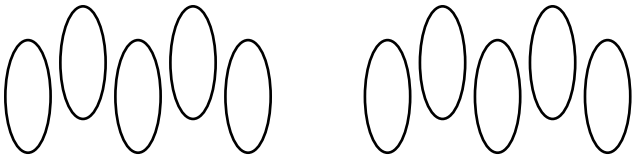
c $\frac{6}{8}$ ☐ $\frac{2}{8}$



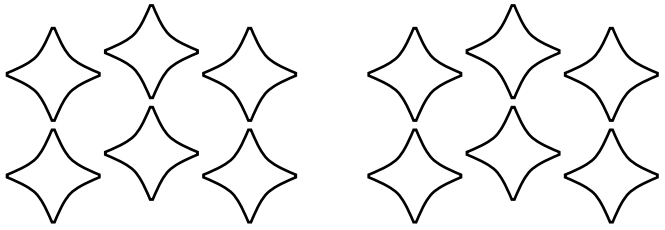
d $\frac{1}{4}$ ☐ $\frac{3}{4}$



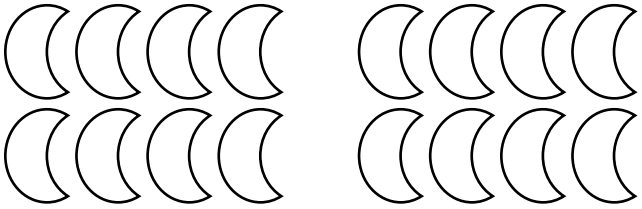
e $\frac{5}{5}$ ☐ $\frac{2}{5}$



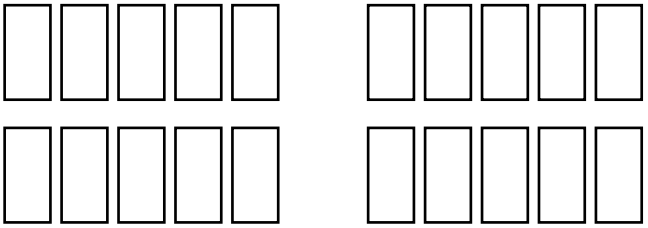
f $\frac{3}{6}$ ☐ $\frac{4}{6}$



g $\frac{1}{8}$ ☐ $\frac{3}{8}$



h $\frac{4}{10}$ ☐ $\frac{2}{10}$



Who am I?

Draw a diagram to find each answer.

1 Dahlia shares a bag of 20 bouncy balls between 5 people.

a How many balls does each person get? ___

b What fraction of the collection does each person get? $\frac{\square}{\square}$

2 Ash has 16 cards. He gives each person 4 cards and has none left.

a How many people does Ash share his cards with? ___

b What fraction of the collection does each person get? $\frac{\square}{\square}$

3 Fox bakes 18 cupcakes. She eats 9 and Joel eats 9.

a How many people shared the cupcakes? ___

b What fraction of the cupcakes did each person eat? $\frac{\square}{\square}$

Fraction bingo

Play in pairs ☺☺, small groups, or as a class. You need one 8-sided spinner and one 6-sided spinner (see pages 22 and 23). Each player needs a pen and a copy of page 24.

1 On the 8-sided spinner write the numbers 1–8 for numerators.

On the 6-sided spinner write 2, 3, 4, 5, 6, 8 for denominators.

2 Each player writes 9 different fractions on their sheet.

3 Spin both spinners to make a fraction.

If you get a fraction over 1, reverse the numerator and denominator, eg $\frac{5}{2} \rightarrow \frac{2}{5}$.

4 All players look for the fraction on their grid.

If they have it, they cross it off.

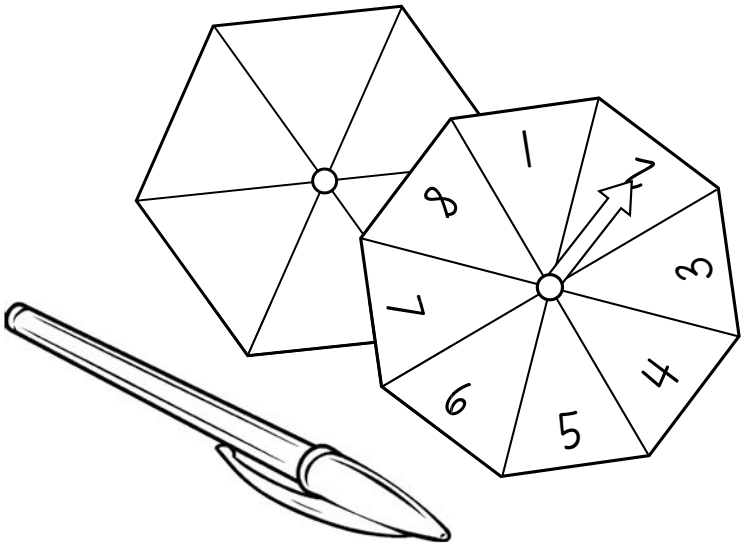
5 Repeat steps 3 and 4, taking turns to make a fraction.

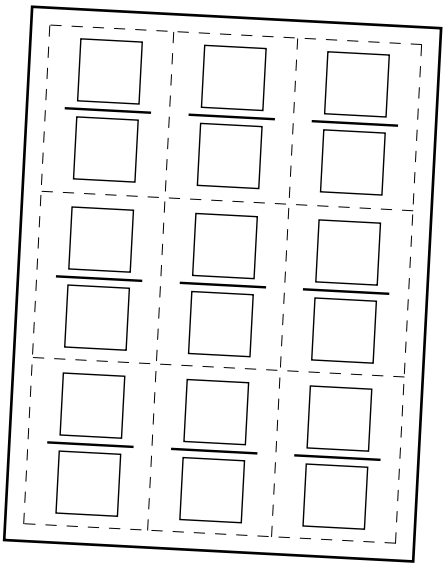
The winner is the first person to cross out all their fractions and call out 'Bingo!'

Harder variations:

Include whole number fractions and fractions over 1.

Add a third spinner and make mixed numbers.





Whole number fractions

Fractions over 1

1 Complete. Use the words numerator or denominator for **1a** and **1b**.

a In the fraction $\frac{6}{3}$, 6 is the _____.

b In the fraction $\frac{6}{3}$, 3 is the _____.

c Draw $\frac{6}{3}$.

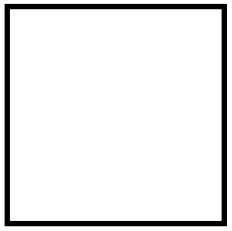
d How many thirds in $\frac{6}{3}$? _____

e How many thirds in one whole? _____

f How many wholes in $\frac{6}{3}$? _____

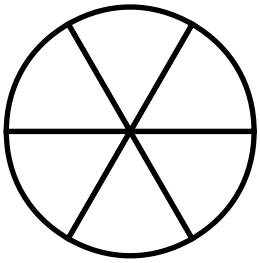
2 Fill in the fractions to match.

a



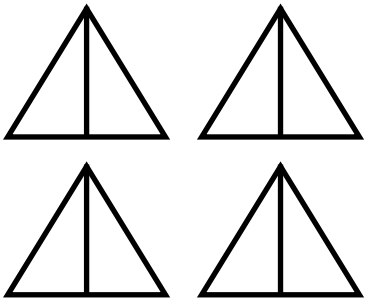
$\frac{\square}{\square}$

b



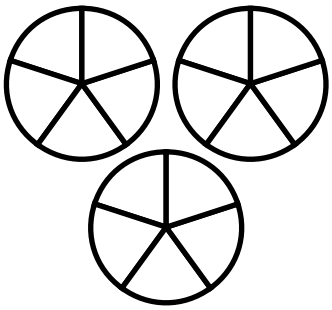
$\frac{\square}{\square}$

c



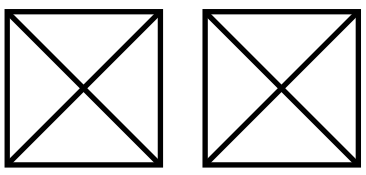
$\frac{\square}{\square}$

d



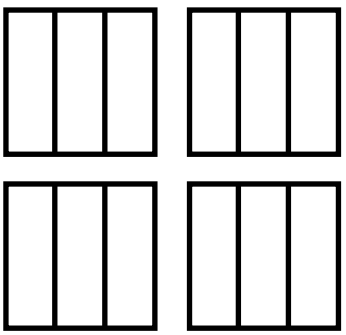
$\frac{\square}{\square}$

e



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

f

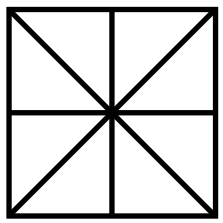


$\frac{\square}{\square}$

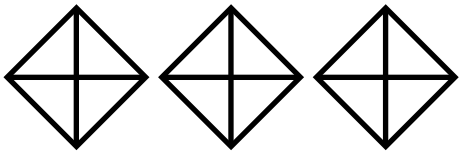
Whole number diagrams

1 Match the fractions.

a



b



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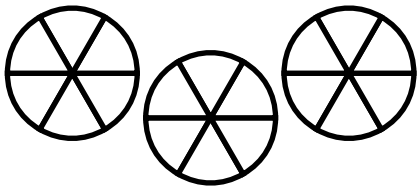

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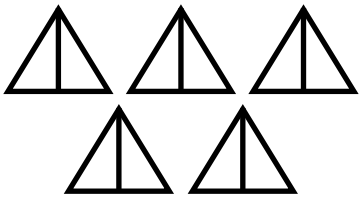
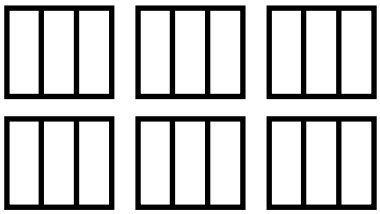


e



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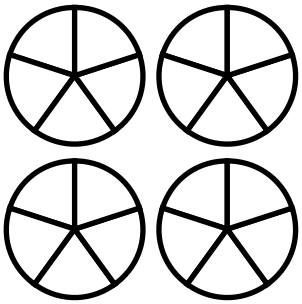


$\frac{18}{6}$ $\frac{20}{5}$ $\frac{18}{3}$ $\frac{12}{4}$ $\frac{8}{8}$ $\frac{10}{2}$

2 Draw shapes to show these fractions.

a $\frac{10}{5}$

b $\frac{6}{2}$

c $\frac{16}{4}$

d $\frac{9}{3}$

How many wholes?

Fractions over 1

1 Complete this sentence using the words numerator and denominator.

To find the number of wholes in a fraction, divide the _____ by the _____.

2 Find the number of wholes.

a $\frac{12}{2} = 12 \div 2 = \_\_\_$

b $\frac{20}{4} = 20 \div 4 = \_\_\_$

c $\frac{16}{8} = \_\_\_ \div \_\_\_ = \_\_\_$

d $\frac{21}{3} = \_\_\_ \div \_\_\_ = \_\_\_$

e $\frac{30}{5} = \_\_\_ \div \_\_\_ = \_\_\_$

f $\frac{12}{6} = \_\_\_ \div \_\_\_ = \_\_\_$

3 Find the number of wholes.

a $\frac{2}{2} = \_\_\_$ wholes

b $\frac{10}{1} = \_\_\_$ wholes

c $\frac{15}{3} = \_\_\_$ wholes

d $\frac{40}{4} = \_\_\_$ wholes

e $\frac{30}{6} = \_\_\_$ wholes

f $\frac{24}{8} = \_\_\_$ wholes

4 Complete.

a $\frac{\square}{2}$ = 7 wholes

b $\frac{\square}{1}$ = 9 wholes

c $\frac{25}{\square}$ = 5 wholes

d $\frac{40}{\square}$ = 5 wholes

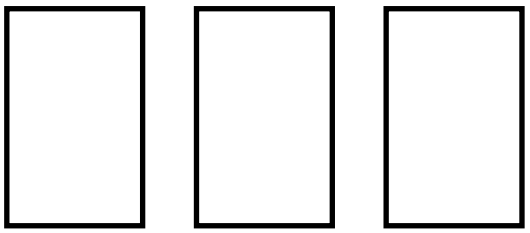
e $\frac{\square}{4}$ = 6 wholes

f $\frac{48}{\square}$ = 8 wholes

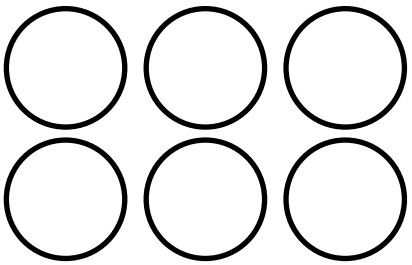
Making whole number fractions

a Write a fraction for each number of wholes.
b Divide the shapes to match.

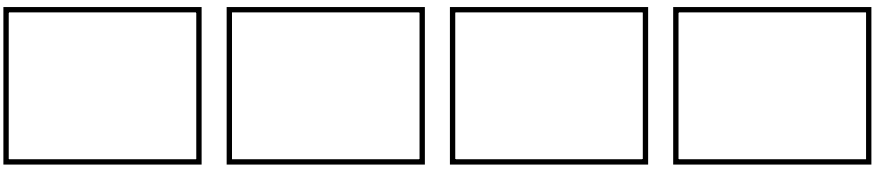
1 3 wholes $\frac{\square}{\square}$



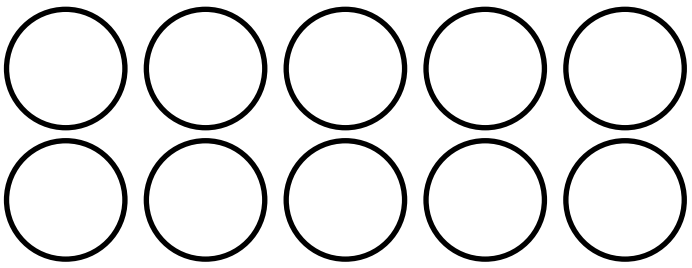
2 6 wholes $\frac{\square}{\square}$



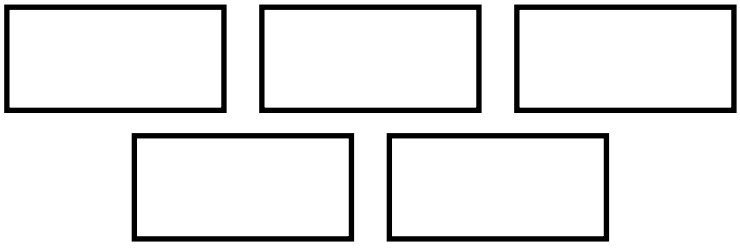
3 4 wholes $\frac{\square}{\square}$



4 10 wholes $\frac{\square}{\square}$



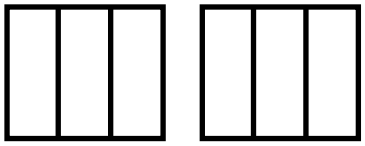
5 5 wholes $\frac{\square}{\square}$



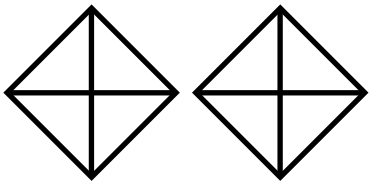
Fractions over 1

1 Colour the parts to match the fractions.

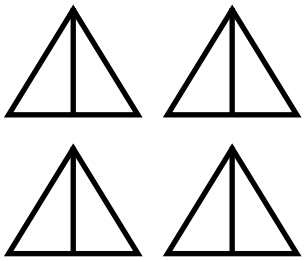
a $\frac{5}{3}$



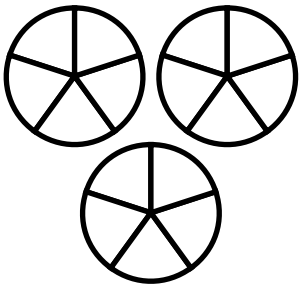
b $\frac{6}{4}$



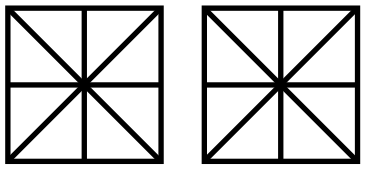
c $\frac{7}{2}$



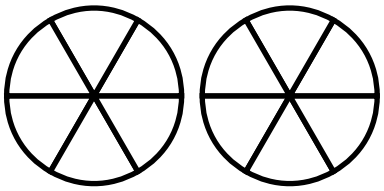
d $\frac{14}{5}$



e $\frac{13}{8}$



f $\frac{11}{6}$



2 Circle the correct answer.

a In the fraction $\frac{5}{3}$, the type of fraction is (thirds) (fifths).

b In the fraction $\frac{5}{3}$, I coloured in (5) (3) parts.

3 Complete these sentences using the words <u>numerator</u> and <u>denominator</u>.

a In the fraction $\frac{5}{3}$, 5 is the _____.

b In the fraction $\frac{5}{3}$, 3 is the _____.

In a fraction over 1 ...

c the _____ is the number of parts in one shape.

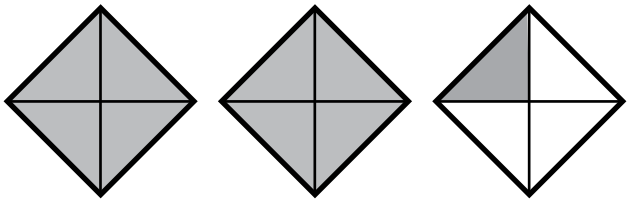
d the _____ is the number of coloured parts.

e the _____ is larger than the _____.

Recognise fractions over 1

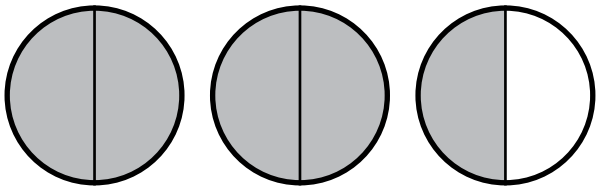
1 Match.

a



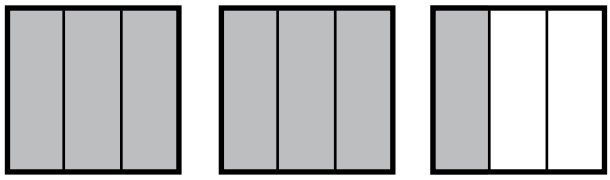
$\frac{5}{2}$

b



$\frac{7}{3}$

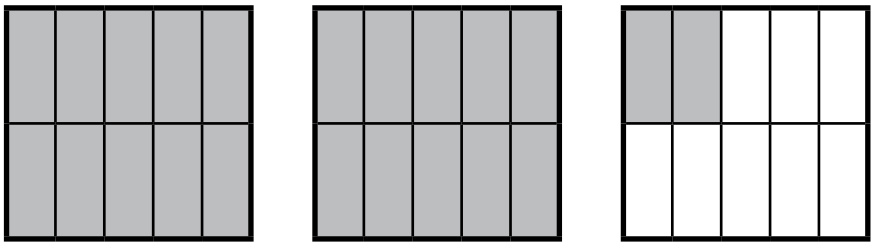
c



$\frac{9}{4}$

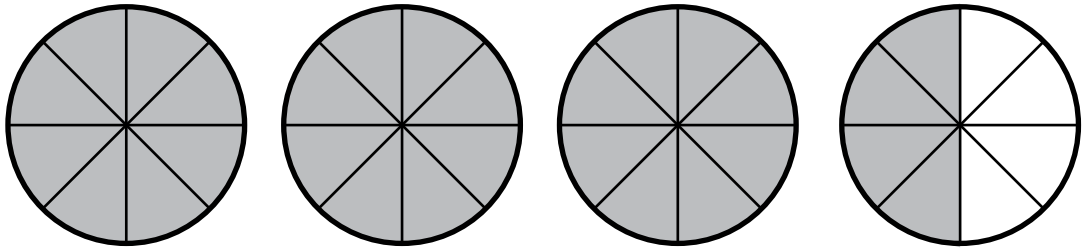
2 Write fractions to match.

a



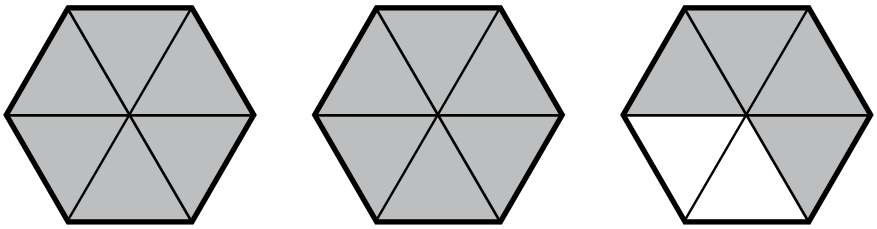
$= \frac{\square}{\square}$

b



$= \frac{\square}{\square}$

c

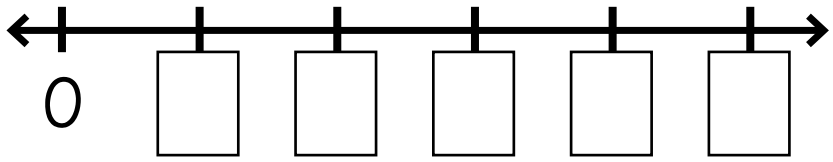


$= \frac{\square}{\square}$

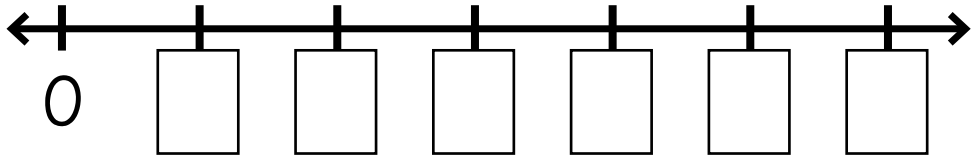
Fraction number lines over 1

Put these fractions in order on the number lines.

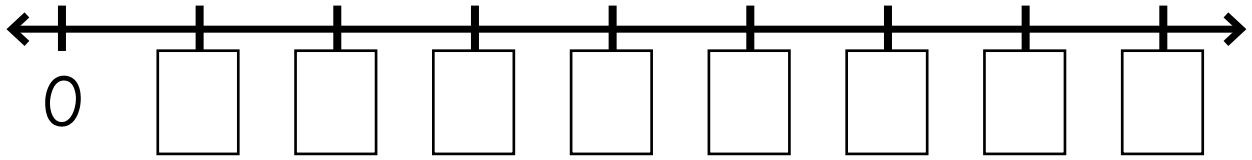
1 $\frac{1}{2}, \frac{3}{2}, \frac{5}{2}, \frac{2}{2}, \frac{4}{2}$



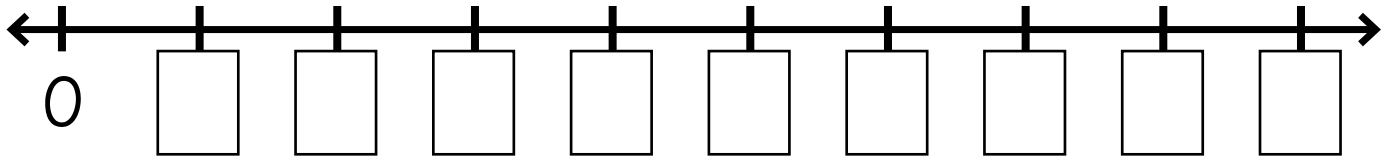
2 $\frac{6}{4}, \frac{3}{4}, \frac{5}{4}, \frac{2}{4}, \frac{4}{4}, \frac{1}{4}$



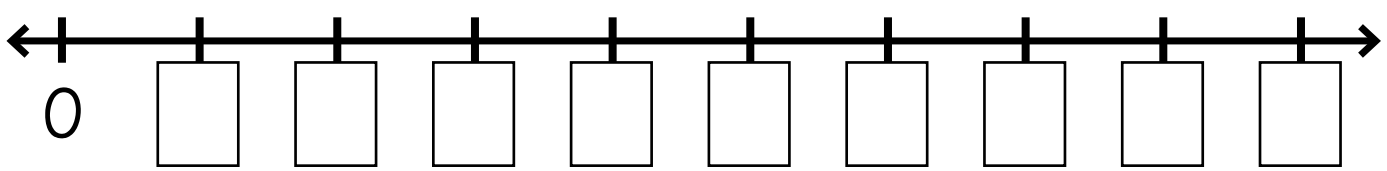
3 $\frac{6}{5}, \frac{3}{5}, \frac{7}{5}, \frac{2}{5}, \frac{4}{5}, \frac{5}{5}, \frac{8}{5}, \frac{1}{5}$



4 $\frac{7}{3}, \frac{1}{3}, \frac{3}{3}, \frac{9}{3}, \frac{5}{3}, \frac{2}{3}, \frac{6}{3}, \frac{4}{3}, \frac{8}{3}$

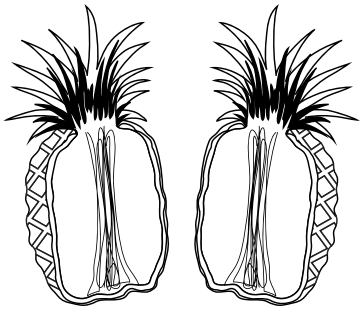


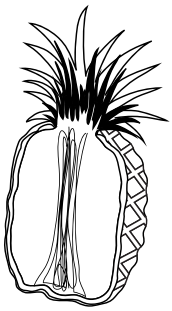
5 $\frac{9}{6}, \frac{1}{6}, \frac{4}{6}, \frac{7}{6}, \frac{2}{6}, \frac{8}{6}, \frac{5}{6}, \frac{3}{6}, \frac{6}{6}$

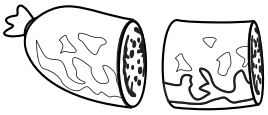


Compare fractions over 1

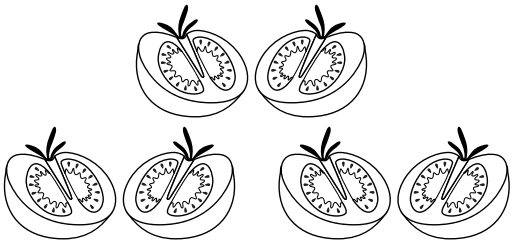
Write each fraction. Colour the fraction of the food you would rather eat.

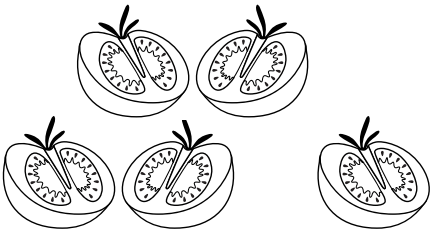
1 a 

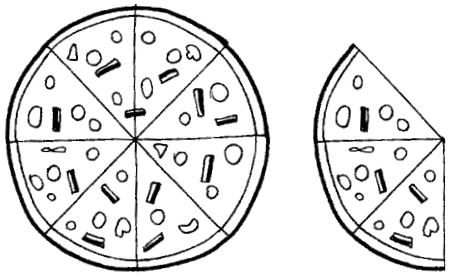
b 

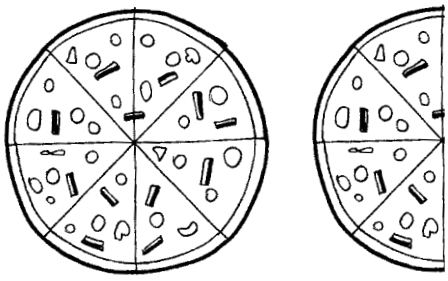
2 a 

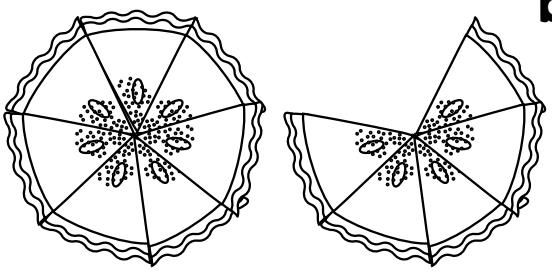
b 

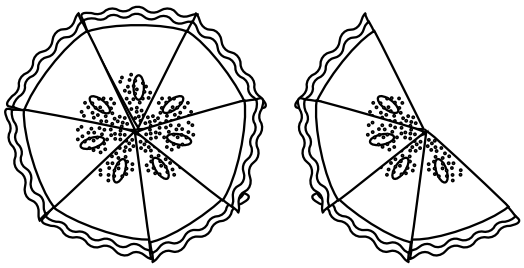
3 a 

b 

4 a 

b 

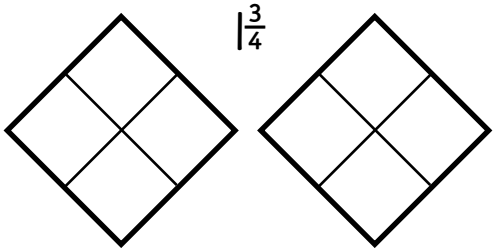
5 a 

b 

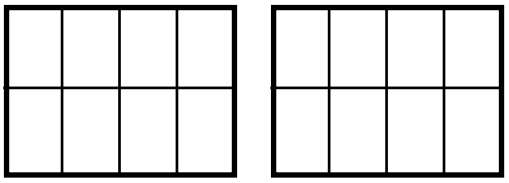
Mixed numbers

1 Colour the fractions.

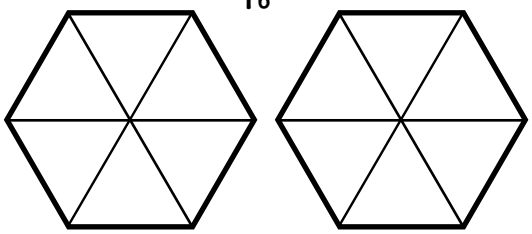
a $1\frac{3}{4}$



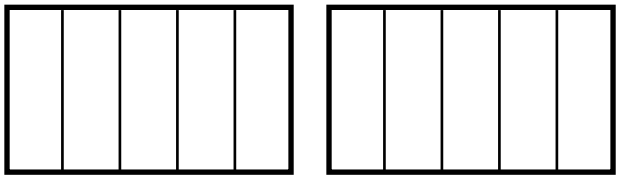
b $1\frac{3}{8}$



c $1\frac{5}{6}$

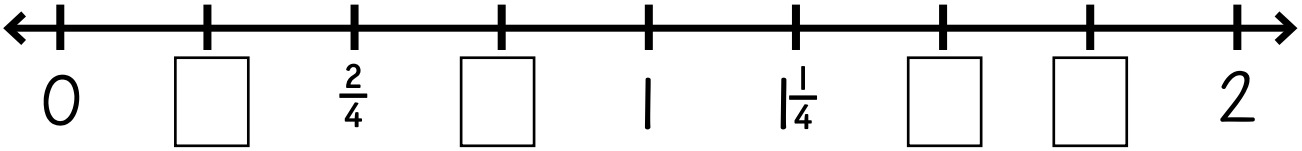


d $1\frac{3}{5}$

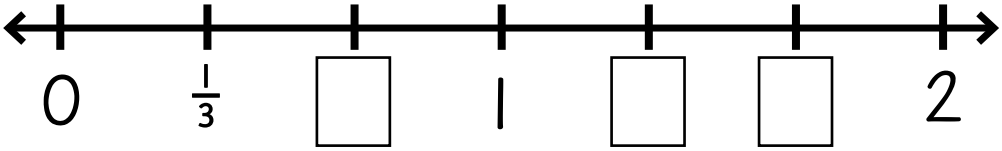


2 Fill in the fraction number lines.

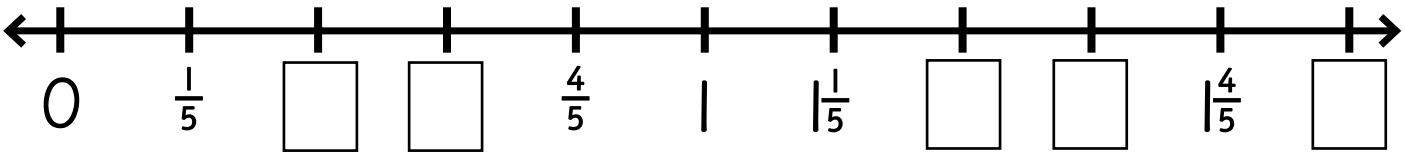
a



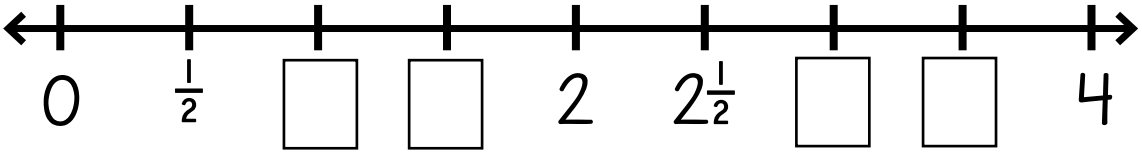
b



c

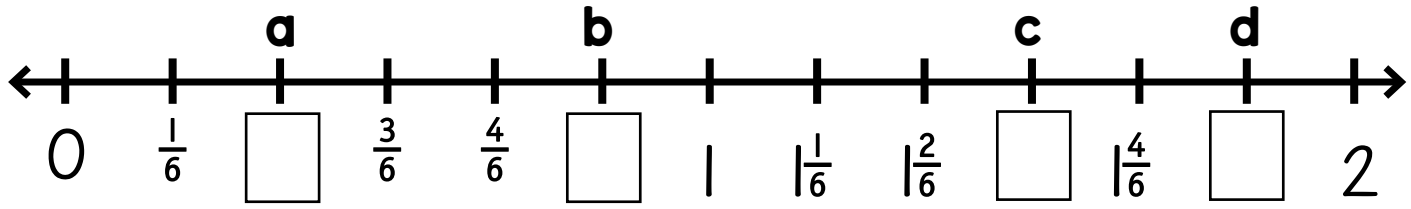


d



Compare mixed numbers

1 Complete the number line.



2 Order from smallest to largest:

$1\frac{1}{2}$ $\frac{3}{4}$ $2\frac{1}{2}$ $1\frac{1}{4}$ $2\frac{3}{4}$ $\frac{1}{2}$ 2

a ☐ **b** ☐ **c** ☐ **d** ☐ **e** ☐ **f** ☐ **g** ☐

3 Compare these pairs of mixed numbers using: **> < =**

a $2\frac{1}{4}$ ☐ $3\frac{1}{4}$ **b** $2\frac{1}{4}$ ☐ $2\frac{3}{4}$ **c** $3\frac{1}{8}$ ☐ $3\frac{4}{8}$

d $1\frac{3}{4}$ ☐ $1\frac{1}{4}$ **e** $2\frac{1}{2}$ ☐ $2\frac{3}{4}$ **f** $3\frac{1}{4}$ ☐ $3\frac{4}{8}$

g $1\frac{2}{8}$ ☐ $1\frac{1}{8}$ **h** $2\frac{6}{8}$ ☐ $2\frac{5}{8}$ **i** $4\frac{4}{8}$ ☐ $4\frac{4}{8}$

4 Write a fraction to complete the sum.

a $\frac{3}{4} > \frac{\square}{\square}$ **b** $1 = \frac{\square}{\square}$ **c** $\frac{1}{2} < \frac{\square}{\square}$

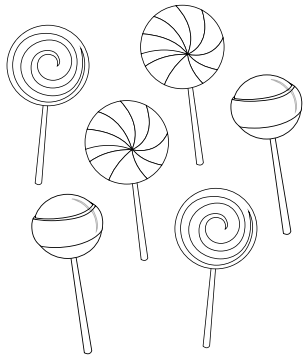
d $1\frac{1}{2} = \frac{\square}{\square}$ **e** $1 < \frac{\square}{\square}$ **f** $1\frac{6}{8} > \frac{\square}{\square}$

g $1\frac{5}{6} > \frac{\square}{\square}$ **h** $1 > \frac{\square}{\square}$ **i** $1\frac{1}{4} < \frac{\square}{\square}$

Party problems

There are 6 party bags to fill. Share these items equally.

1

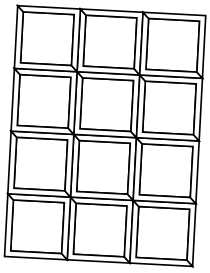


a How many lollipops are there? _____

b How many go in each party bag? _____

c What fraction of the lollipops goes in each bag? $\frac{\square}{\square}$

2

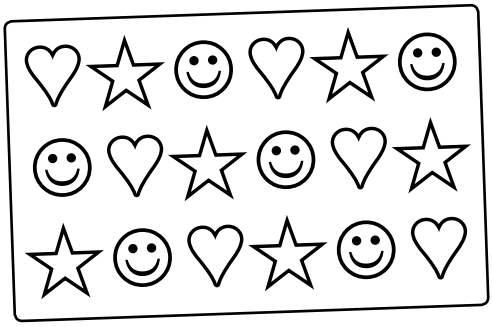


a How many squares of chocolate are there? _____

b How much goes in each bag? _____ pieces

c What fraction of the bar goes in each bag? $\frac{\square}{\square}$

3



a How many stickers? _____

b How many in each bag? _____

c What fraction of the stickers goes in each bag? $\frac{\square}{\square}$

4 What is in one party bag? Draw the contents.

5 Share this cake between 8 people. Draw the lines to cut along.

Compare fractions games

GO LARGE

Play in pairs ☺☺. You each need a pen and a copy of page 24. You also need one 8-sided spinner numbered 1–8 (see page 22).

Aim of the game:
Make the largest fraction, including fractions over 1.

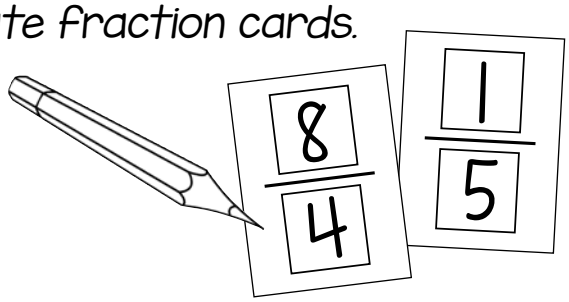
1. Each person needs 3 blank fractions for each game. Hide your sheets from each other.
2. Take turns spinning a digit on the spinner.
3. Decide which fraction to put the digit in and whether it will be a numerator or denominator. Write the digit in a box. Once written it can't be changed.
4. After 6 spins you should both have 3 fractions. Compare them. You may want to draw fraction diagrams. The winner has the largest fraction.

Variation: Aim to make the smallest fraction.

BIG, BIGGER, BIGGEST

Play as a class. You need 2 class sets of empty fractions (see page 24) cut into separate fraction cards.

1. Make a class set of fraction cards:
   a. Give each person 2 cards.
   b. They write a fraction under 1.
   c. And a fraction over 1.



2. Shuffle all the cards and deal 1 card to each person.
3. Pair up and compare your fractions. Draw a diagram on the back of the card if necessary.
4. If you have the smaller fraction, sit down. If you have the bigger fraction, pair up with someone new.
5. Keep pairing up and comparing fractions until one person is left. The winner has the largest fraction.

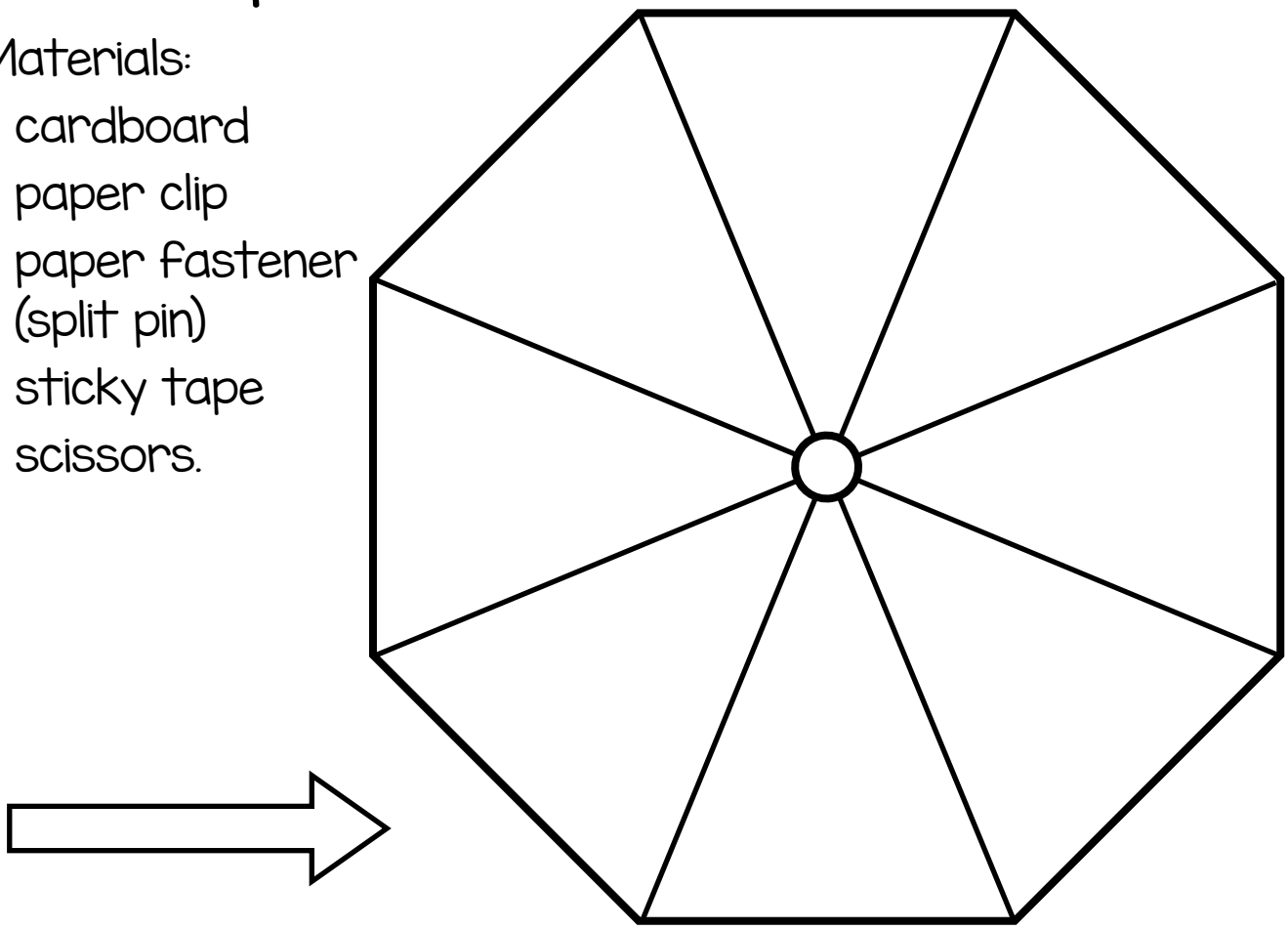
Variation: The winner has the smallest fraction.

8-sided spinner

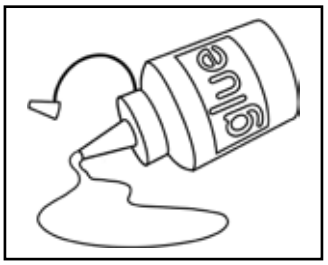
Resources

Materials:

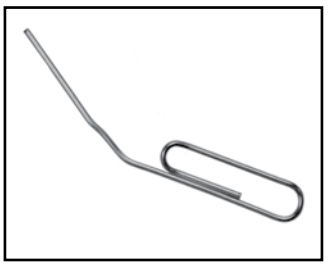
- cardboard
- paper clip
- paper fastener (split pin)
- sticky tape
- scissors.



1. Print or glue the spinner and the arrow onto cardboard. Write on the numbers. You can laminate them after this.

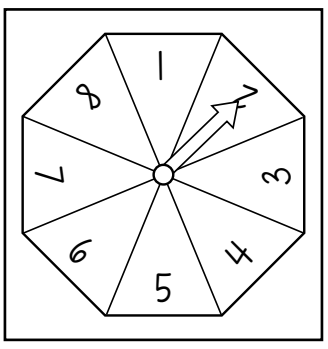


2. Bend out one end of the paper clip to make the spinning pointer.



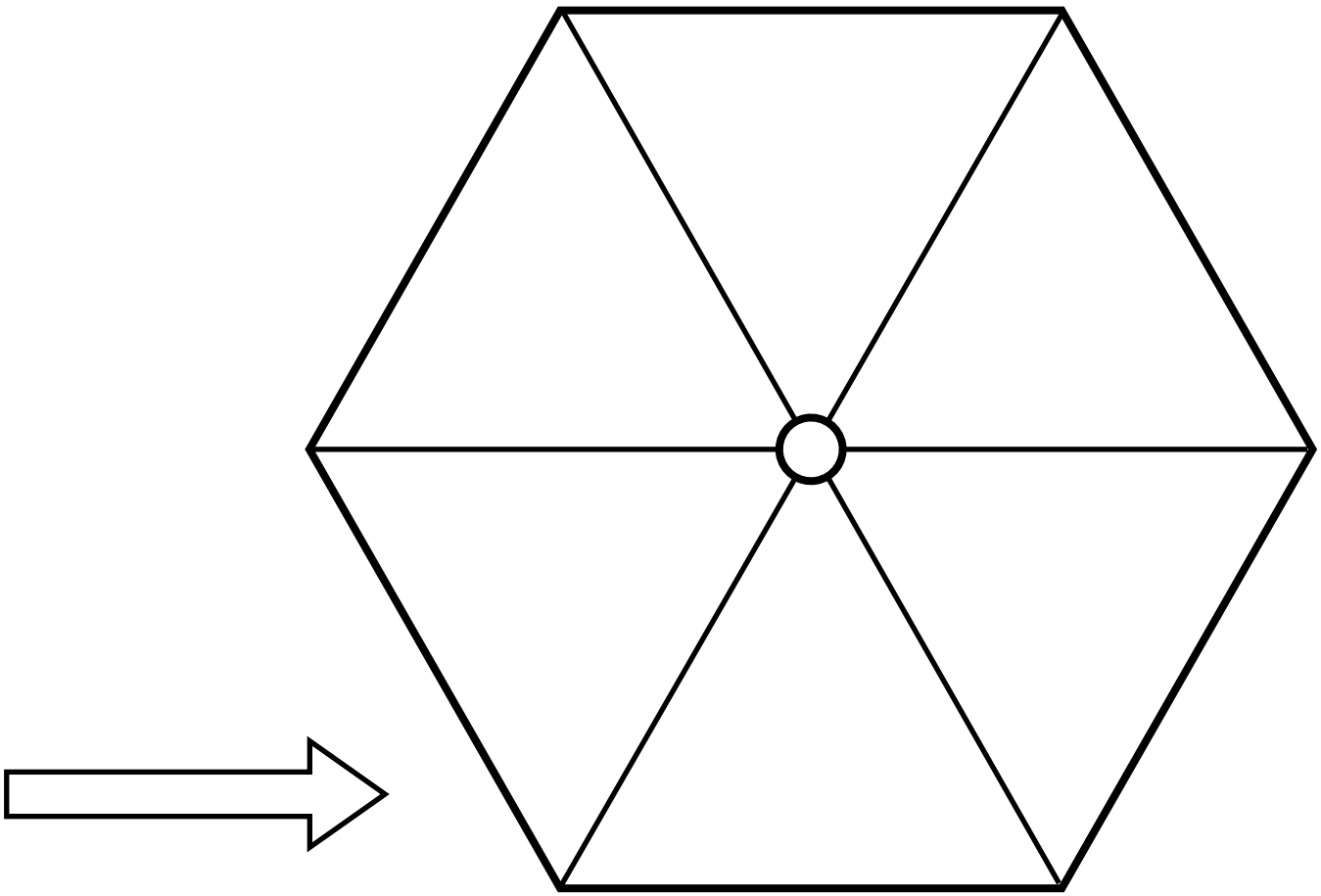
3. Insert the split pin with the paper clip on it through the centre of the spinner.

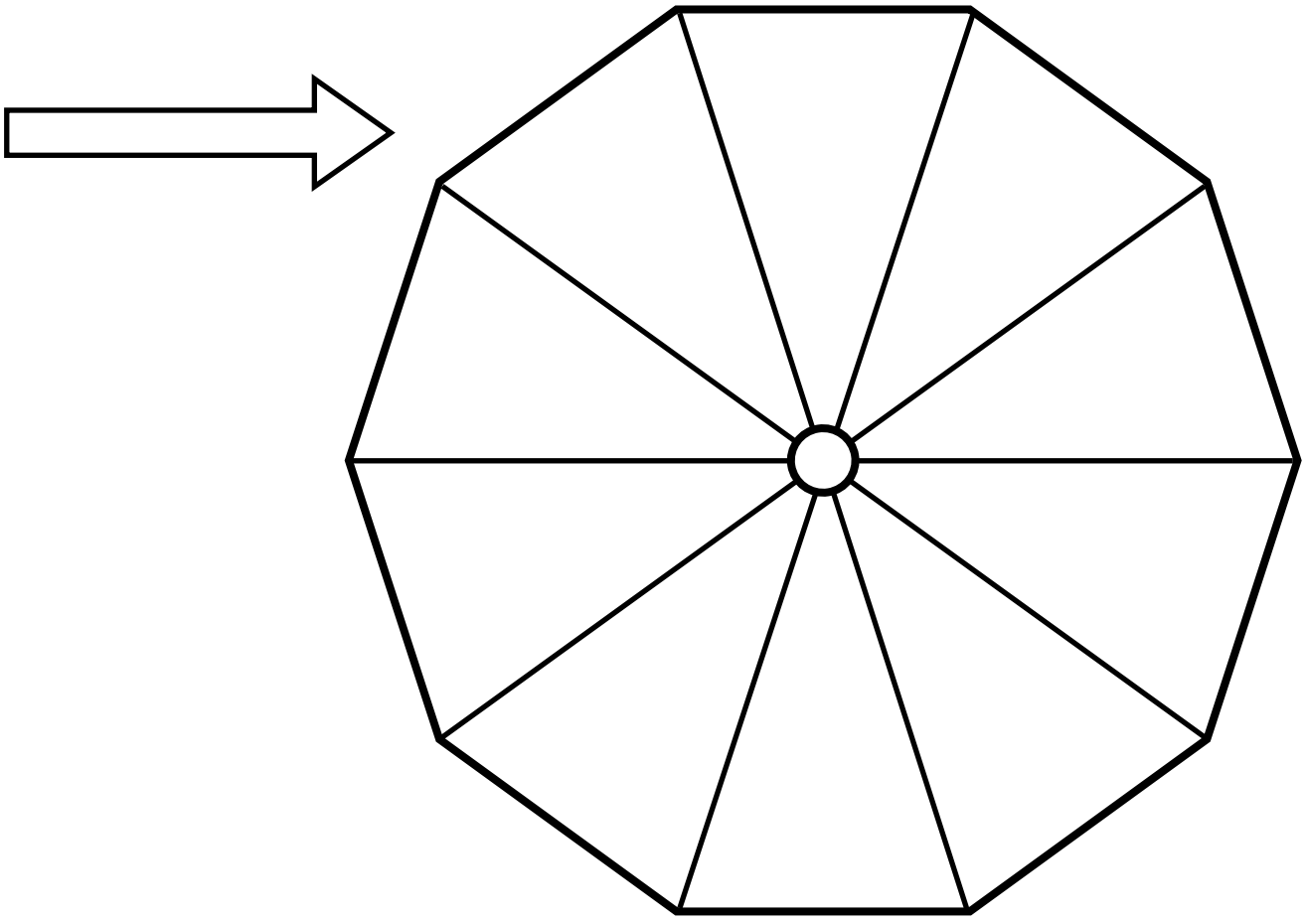
4. Split the back of the pin and tape the ends down. The top of the split pin should sit about 1 cm above the card to allow the paper clip pointer to spin freely.



5. Tape the arrow onto the paper clip.

6 and 10-sided spinners





Blank fractions