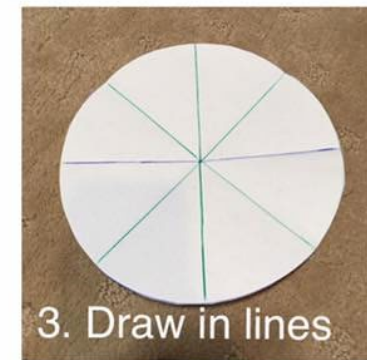
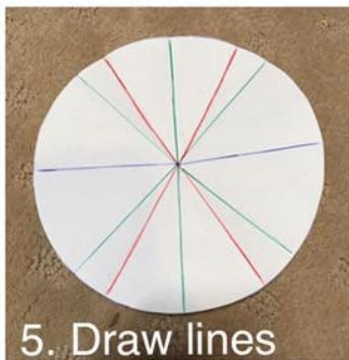


Here is a photo showing how to make a protractor. If you fold each 30° angle in half again, you will have 15° sections. This is close enough for estimating angles for this task and the next few.



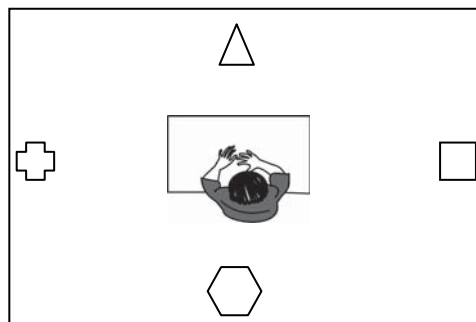
PROBLEM 35: ANGLES AND TURNS

Look at the following situations and work out what the descriptions mean. Use this understanding to give your own directions to the places specified below.

Degrees of turn:

Look at the picture below and the instructions given.

See if you can work out what 'quarter turn' and 'half turn' mean.



- Jemma sits in the middle and faces the triangle. She turns a **half-turn**. This means that she is facing the hexagon.
- Jemma faces the triangle. She turns a **quarter-turn clockwise**. This means that she is facing the square.
- Jemma faces the triangle. She turns a **quarter-turn anticlockwise**. This means that she is facing the cross.

1. What does a half-turn mean?

2. What does a quarter-turn mean?

3. Stand up behind your desk. Turn a half-turn. What are you facing?

4. Stand up behind your desk. Turn a quarter-turn clockwise. What are you facing?

5. Stand up behind your desk. Turn a quarter-turn anticlockwise. What are you facing?

6. Stand up behind your desk. Turn a half-turn, then a quarter-turn clockwise. What are you facing?

7. Stand up behind your desk. Turn a half-turn, then another half-turn. What are you facing?

Giving your own directions


Using what you have learned about turns, write some directions for a friend to follow:

Work out what they would be facing at the end but don't write it down.

Swap books with a friend and follow each other's directions to find out how well the directions worked. Write your answer on your friend's book and have them write their answer here:

Friend's name: _____

How well did the directions work? Explain your answer:

 **Understanding and manipulation:** Start facing where your directions ended. Reverse your directions so that you end up where you started. Write them here:

Teacher initials:

Date:

Problem solving / T&R:

- Problem solved with minimal or non-mathematical prompting
- Some leading questions were used to prompt thinking
- Solved after explanation
- Did not work out solution
- N/A- not a novel problem

Reasoning / Comm.:

(verbal, written, working and equations, or visual representations)

- Clearly and logically reasoned, clear directions
- Easily understood reasoning and directions
- Understood with some interpretation needed
- Some gaps or miscommunications
- Minimal or off topic

Understanding / Reflect:

- Connected manipulation problems to previous questions and answered easily
- Connected manipulation problems to previous questions with some prompting, and answered correctly
- Answered once the similarities to previous questions had been pointed out
- Had some problems in answers but was on the right track
- Did not answer appropriately
- Student not observed

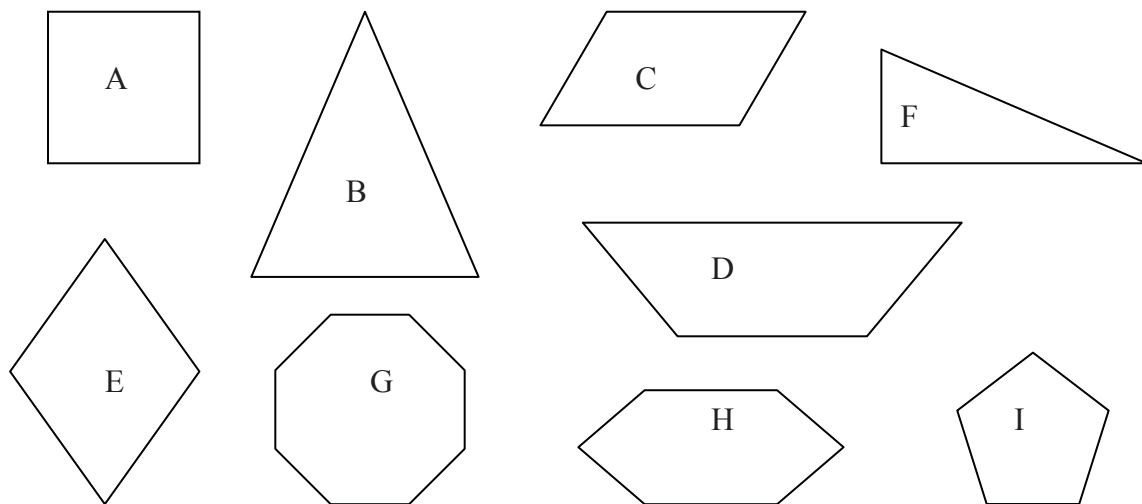
K1. Properties of lines in 2D shapes

The sides of many 2D shapes are straight lines. They can be described in lots of different ways. In this activity you will learn to ask and answer some questions about lines that border shapes.

Questions you can ask about the sides of 2D shapes:

1. How many are there?
2. How long are they?
3. Are there any the same length? Which ones?
4. What position are they in: horizontal, vertical or oblique (on an angle that is not horizontal or vertical)?

Look at the shapes below, work out the answers and write them in the table.



Shape	How many?	How long?	Same length?	Position?
A	4	2cm each	Yes	2 h 2 v
B				
C				
D				
E				
F				
G				
H				
I				

What is one way that I could group the shapes above? List the categories that you could use to group them, and write the letter of the shape in the group.

What is one other way that I could group the shapes above? List the categories that you could use to group them, and write the letter of the shape in the group.

What is one other way that I could group the shapes above? List the categories that you could use to group them, and write the letter of the shape in the group.

What patterns have I found for grouping the shapes? What properties am I using?

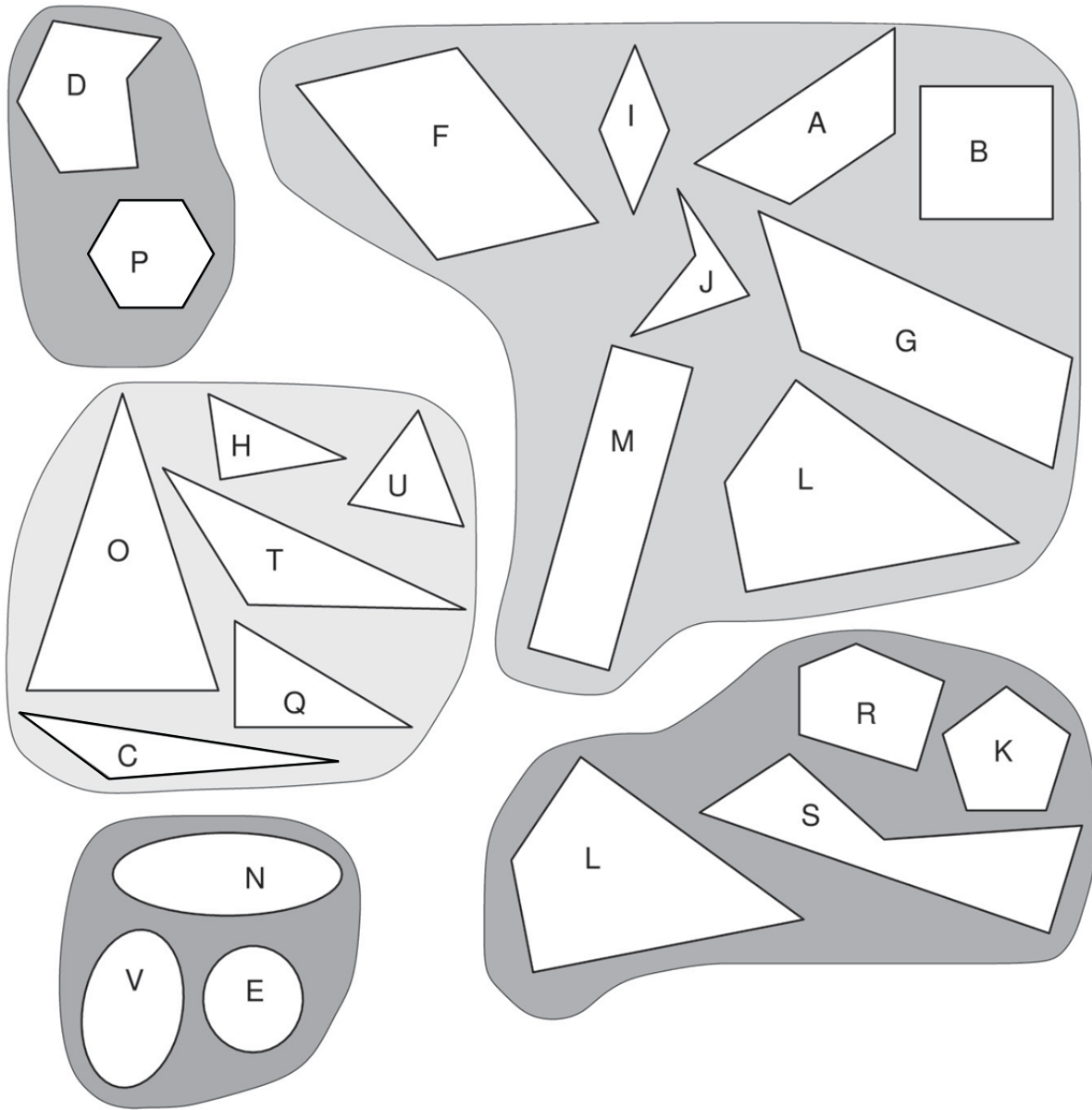
X	3	4	5	6	7	8	9
3							
4							
5							
6							
7							
8							
9							

Record your time here for the 49 questions:

Mark your answers using a calculator or with an adult. Circle any that are wrong.

K2. Shape families

How have these shapes been grouped into families?



How have the shapes been grouped into families? Did you find the shape in the wrong family?

How are the families similar? How are the families different?

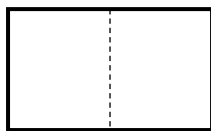
Interleaved practice

Number:

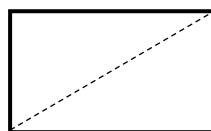
- Complete the following number sequence: 68 , 63 , ___ , ___ , 48 , ___ , ___ , 33
- $14\,328 + \underline{\hspace{2cm}} = 21\,502$
- What arrays can you make with 36 counters? Draw the arrays that you made.
- What number comes after 19 909?
- Find two different ways to make \$71.85 without using any gold coins.

Measurement/Geometry:

- Use a ruler or tape measure to find the length of 3 objects that are longer than 30cm and shorter than a metre. Write the name of the objects and their length here.
- What time will it be in 110 minutes?
- The dotted line in shape 1 shows a line of symmetry. It is not a line of symmetry in shape 2. Why not? Draw a different line of symmetry in shape 3



shape 1



shape 2



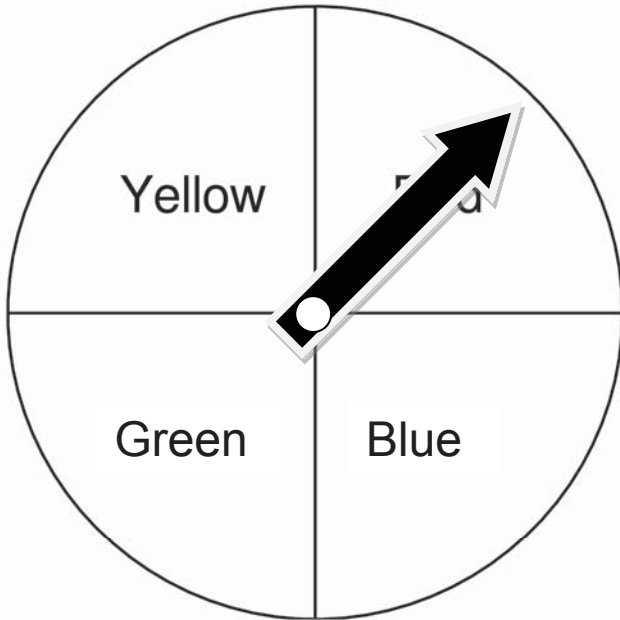
shape 3

Chance/Data:

- Choose 5 different types of toys and work out how many you have. Design a table to record your findings.

☐ Look at the spinner below. A game is played where each player gets to spin the spinner. A point is scored by the player who's section the spinner lands in. Answer the questions and work out who won the game. Use a pointer for the spinner if needed.

The spinner is currently in the middle of the Red section.



THINKING QUESTION:
How could Elijah spin the spinner from its starting position so that he would score a point? List as many ways as you can think of.

Tally chart for recording the points:

Elijah	Yellow + Red	
Jane	Green + Blue	

What really happened:

Elijah went first. He spun the spinner a half-turn. What did it land on? Add the point to the table.

Jane went next. She spun the spinner a quarter-turn clockwise. What did it land on? Add the point to the table.

Elijah spun the spinner another quarter-turn clockwise. What did it land on? Add the point to the table.

Jane spun the spinner a whole turn and another half turn. What did it land on? Add the point to the table.

Elijah spun the spinner three quarter-turns anticlockwise. What did it land on? Add the point to the table.

Jane spun the spinner three quarter-turns clockwise. What did it land on? Add the point to the table.

Who won?

K3. Properties of angles in 2D shapes

Angles in 2D shapes can be classified into various types.

Measure the following angles and try to determine how they are classified.

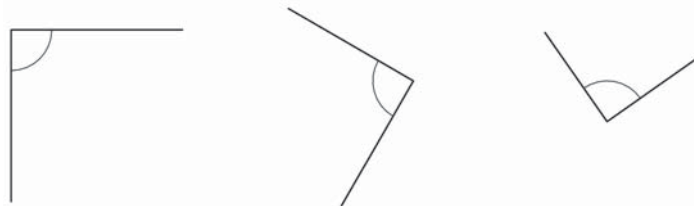
Acute Angles:



Obtuse Angles:



Right Angles:



Straight Angles:



Reflex Angles:



How big is this compared to a right angle?

BACKWARDS QUESTION: See if you can draw the following in your maths books.

A shape with 4 sides and a reflex angle

A triangle with one obtuse angle

A triangle with two obtuse angles