

Spend about 20-30 minutes discussing these Powerpoint examples with your parent/carers before having a go at your independent work in your exercise books.

Problem solving – time 2

Discover



I need to be in Stanton by 1:25 pm.

Winbee

11:43

Train timetable				
Peterbrook	10:10	10:40	11:10	12:10
↓				
Winbee	11:05	11:35	12:05	13:05
↓				
Kings Hill	11:40	12:10	12:40	13:40
↓				
East Willow	11:58	12:28	12:58	13:58
↓				
Stanton	12:13	12:43	13:13	14:13
↓				
Downhurst	12:38	13:08	13:38	14:38

Sofia

- 1 a) How many minutes will Sofia have to wait for her train?
- b) The same journey by bus takes double the time.
The bus arrives in Stanton at 13:10.
What time does it leave Winbee?

Share

a) Sofia needs to be in Stanton by 1:25 pm.
This is 13:25 using the 24-hour clock.
She can take the 12:05 from Winbee, arriving at 13:13.
The time now is 11:43.

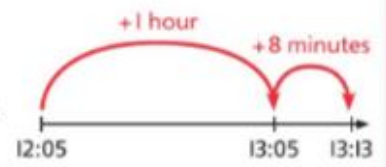
The timetable uses the 24-hour clock. I need to convert 1:25 pm to a 24-hour time first.

Use a time line to check how long she must wait.



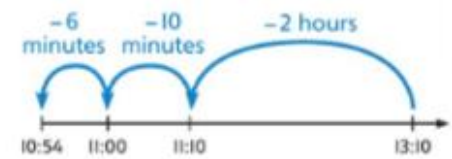
Sofia will have to wait 22 minutes for her train.

b) The bus journey takes double the time of the train journey.
The train journey is 1 hour 8 minutes
so the bus journey is
2 hours 16 minutes.



The bus arrives in Stanton at 13:10.

I can use a time line to subtract 2 hours 16 minutes to find out the time the bus leaves Winbee.



The bus leaves Winbee at 10:54.



Think together

- 1 Sofia meets Jen at the sports centre in Stanton to play badminton. The cost of hiring the court is £2.95 per 20 minutes. The cost of hiring a racquet is £2.60 each. Sofia and Jen play from 14:00 to 15:40. How much do they pay together in total?

There are several steps to these problems. I must check that I have answered each step.

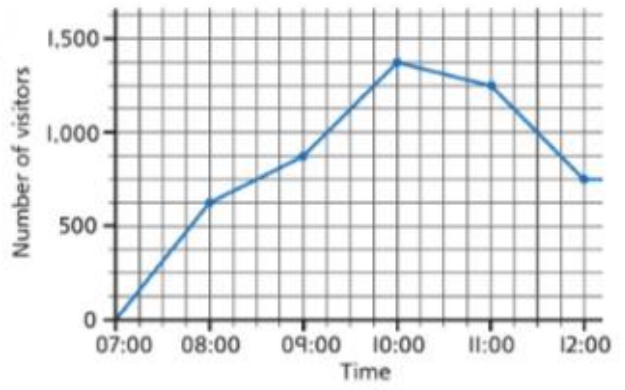


- 2 Here is the timetable showing the use of the badminton courts each weekend.

Times	Saturday	Sunday
08:30–10:30	lessons	for hire
10:30–12:00	for hire	lessons
12:00–14:15	competition	competition
14:15–16:00	for hire	lessons
16:00–17:30	lessons	for hire
17:30–20:45	for hire	closed

- a) What is the total number of hours for which the courts are used for lessons?
- b) The courts are available for hire on both days. For how much longer are they available on Saturday?

- 3 The time graph shows the number of visitors to the sports centre one Saturday morning.



- a) At what times were there 750 visitors?
- b) For how many minutes were there 1,000 or more visitors at the sports centre?

- 4 There is a swimming pool at the sports centre. The pool is 35 metres long and 16 metres wide. Holly swims 18 lengths in 45 minutes. Toshi swims 80 widths in 1 1/2 hours. Who is the faster swimmer?



Toshi swims for longer but he is only swimming widths.

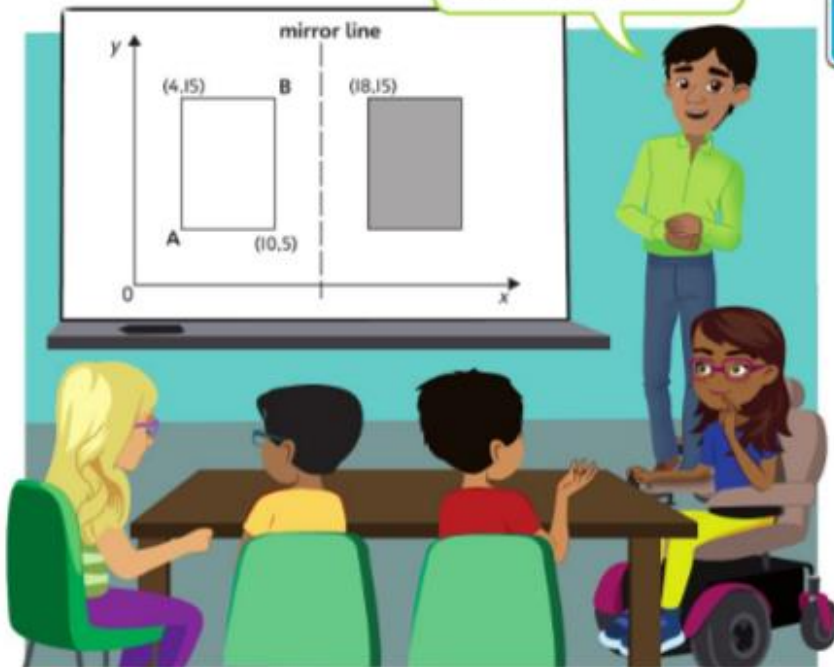
I think I need to find out how far each person swam first.



Problem solving – position and direction

Discover

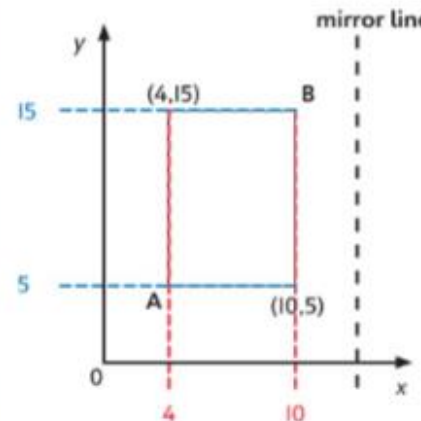
What are the coordinates of vertices A and B?



- 1 a) Give the coordinates of vertices A and B.
- b) The rectangle is reflected in a mirror line. One vertex is at (18, 15). What are the coordinates of the other three vertices?

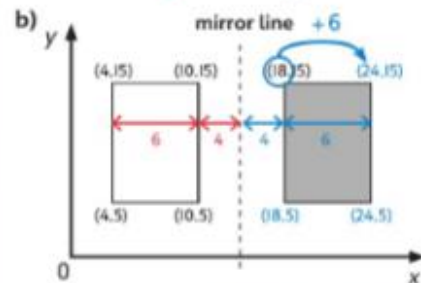
Share

a) The coordinates of two vertices are (4, 15) and (10, 5).



I can use what I know about the structure of the coordinate grid.

Vertex A is (4, 5).
Vertex B is (10, 15).



Each rectangle is 6 units wide.
From (10, 15) to (18, 15) there is a distance of 8 units. Each rectangle must be 4 units from the mirror line.

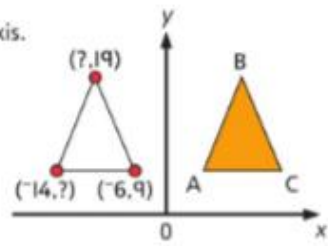
The coordinates of the reflected vertex B are (18, 15). Add 6 to the x-coordinate to locate another vertex at (24, 15).

I know that a reflected shape is the same size as the original shape.

Work out the other reflected vertices in the same way. They are (18, 5) and (24, 5).

Think together

1 An isosceles triangle is reflected in the y-axis.



a) One of the vertices of the original triangle is (-6, 9).
What are the coordinates of the other two vertices?

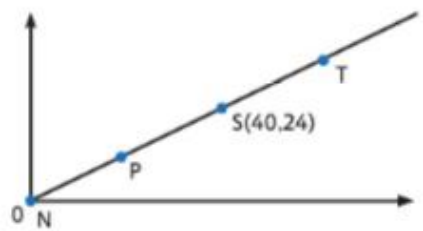
The other two vertices are (-14,) and (, 19).

b) What are the coordinates of the reflected triangle, ABC?

A (,) B (,) C (,)

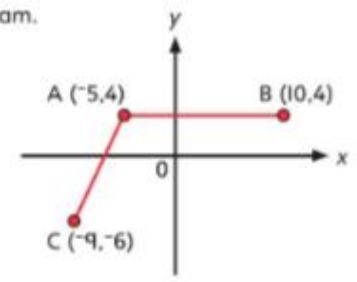
2 Points N, P, S and T are an equal distance from each other.

What are the coordinates of points P and T?



P (,)
T (,)

3 Jamie draws two sides of a parallelogram.



a) Where should she plot the fourth vertex, D, to complete the parallelogram?

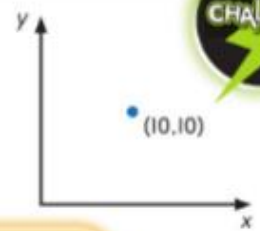
b) The shape is translated 5 units right and 4 units up.

What are the new coordinates of vertex C?

4 The length of a side of a square is 5 units. The coordinates of one vertex are (10, 10).

a) What are the possible coordinates of the other three vertices?

Find at least two different solutions.



I think there are four possible squares so I need to think about all of them.

b) The coordinates (8, 12) will be inside only one of the squares.

Max

Explain why Max is correct.

Problem solving – properties of shapes 1

Discover



Question 1

Not drawn to scale

The diagram shows an isosceles triangle inside a rectangle. Calculate the sizes of angles a and b.

- 1 a) Calculate the size of angle a.
- b) Now use what you know to calculate angle b.

Share

a)

I am going to write all the information I know on the diagram.

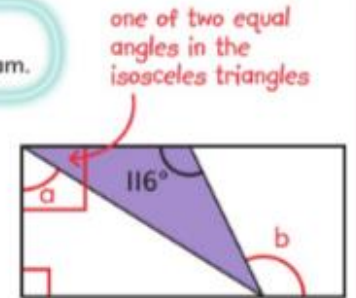


We can calculate the size of each of the equal angles in the isosceles triangle:

$$(180^\circ - 116^\circ) \div 2 = 32^\circ$$

Angle a is part of a right angle, 90° .

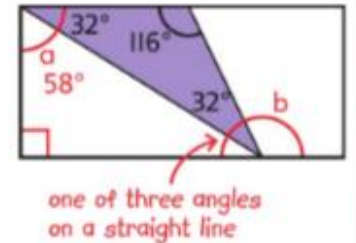
angle a = $90^\circ - 32^\circ$, so angle a is 58° .



- b) We know two of the angles in the right-angled triangle.

We can work out the third angle:
 $180^\circ - 90^\circ - 58^\circ = 32^\circ$

Angle b is one of three angles on a straight line.



Remember that angles on a straight line add up to 180° .

We now know that $32^\circ + 32^\circ + b = 180^\circ$.

So, $180 - 64 = 116$.

Angle b is 116° .



Think together

1 This diagram includes an isosceles triangle.

Not drawn to scale

- a) What are the sizes of angles a and b?
Angles a and b are both °.
- b) What are the sizes of angles c and d?
Angles c and d are both °.

2 Here is a scalene triangle.

Not drawn to scale

- Angle m is °.
- Angle n is °.



Remember that angles that meet at a point add up to 360°.

3 Three angles meet at a point.

Angle a is obtuse. It is half the size of angle b.

Angle c is acute. It is 15° smaller than a right angle.

What is the size of each angle?

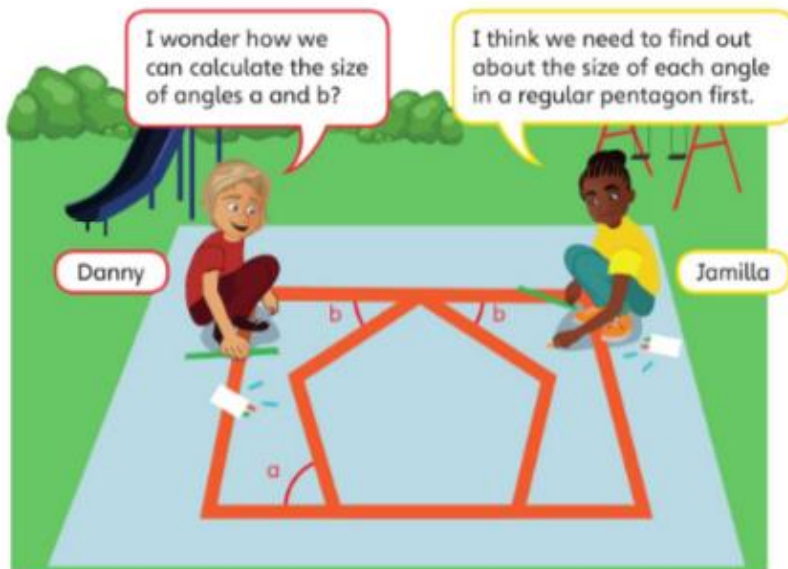
4 Work out the size of angles x, y and z.

Not drawn to scale

I'm going to need to work out the size of some of the other angles before I can work out the size of angles x, y and z.

Problem solving – properties of shapes 2

Discover



I wonder how we can calculate the size of angles a and b?

I think we need to find out about the size of each angle in a regular pentagon first.

Danny

Jamilla

- a) What is the size of each angle in a regular pentagon?
- b) Calculate the sizes of angles a and b.

Share

a)

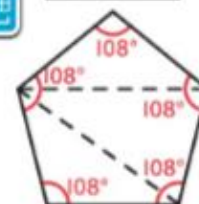
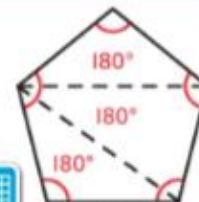
I know that I can split a regular polygon into triangles. The sum of the angles in each triangle is 180° .

There are 3 triangles inside this pentagon.

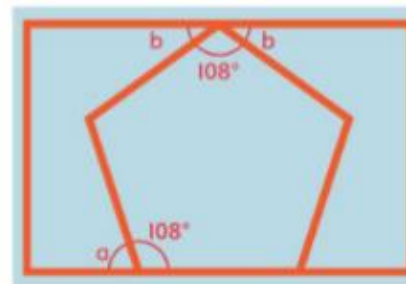
$$180^\circ \times 3 = 540^\circ$$

The interior angles in the pentagon total 540° .

$$\text{So each angle is } 540^\circ \div 5 = 108^\circ.$$



b) Label other angles that will help.



I have noticed that angle a and one of the angles in the pentagon are on a straight line.

Angle b is also on a straight line with an angle in the pentagon but there are two angles labelled b.

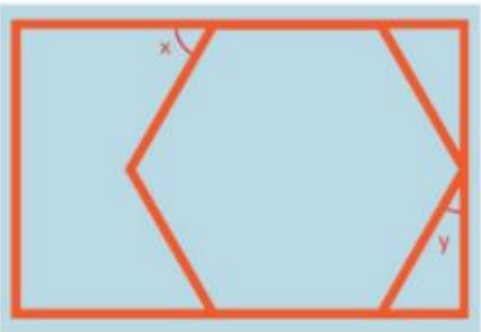
$$\text{Angle a is } 72^\circ \text{ because } 180^\circ - 108^\circ = 72^\circ.$$

Angle b must be $72^\circ \div 2 = 36^\circ$ because there are two angles of the same size.

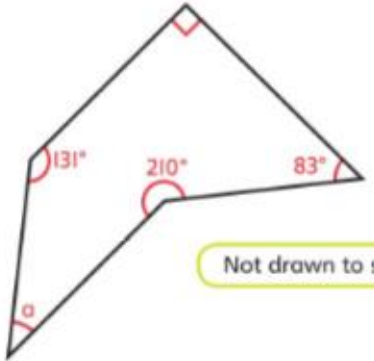
$$36^\circ + 36^\circ + 108^\circ = 180^\circ$$

Think together

1 Danny and Jamilla now draw a regular hexagon inside a rectangle. Calculate the sizes of angles x and y.



2 What is the size of angle a in this irregular pentagon?

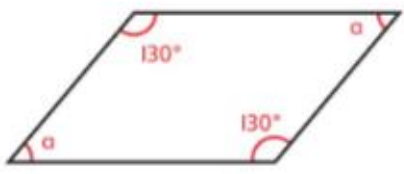


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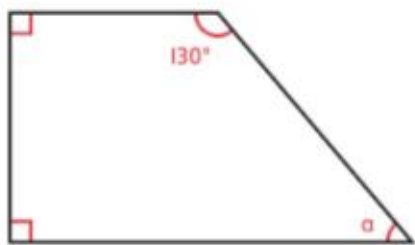
I think that the total of the interior angles in any pentagon is 540°.



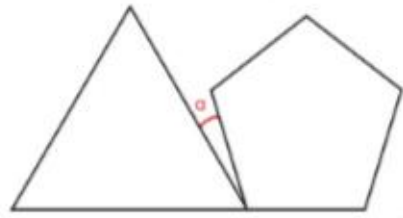
3 Here are two quadrilaterals. Explain how you know that angle a in each quadrilateral is 50°.



Not drawn to scale



4 This diagram shows a regular pentagon joined to an equilateral triangle. Work out the size of angle a.



I can see that the shapes meet on a straight line.

I am going to use what I know about the sizes of angles in an equilateral triangle and a regular pentagon.



Discuss with your parent/carer and then complete the lesson in your book 6C p 87

End of unit check



1 Put the numbers in order, starting with the smallest.

A B C D E

148,500 98,4000 184,500 200,795 89,750

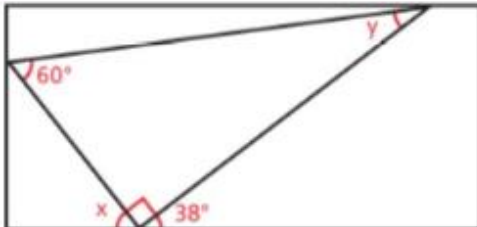
One has been done for you.

smallest _____ A _____ largest

2 The temperature falls by 12° . What is the new temperature?



3 Find the size of angles x and y .



4 The total value of four cars in a car showroom is £98,700. Here are three of the cars.

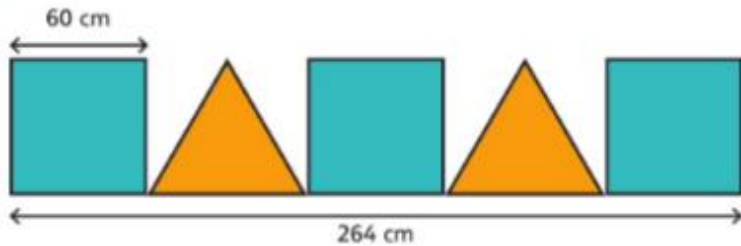
£55,700 £10,200 £13,100

What is the price of the fourth car? What method will you use to calculate this?

5

What fraction of the whole bar is not shaded?

- 6 Three identical squares and two identical triangles are placed in a line.



What is the length of the base of one triangle? What method will you use to calculate this?

- 7 A school is raising money to buy library books.
Complete the table to show the money collected.

	Class 1	Class 2	Class 3	Total
Cake sale	£27.50		£32.29	
Fun walk	£53.80	£45.20		£164
				£264.50

- 8 Jamie buys 800 g of fruit.
25% of the fruit are strawberries.
35% of the fruit are cherries.
The rest are raspberries.
How many grams of raspberries does Jamie buy? Show your method.

- 9 On a bookshelf, there are 3 picture books for every 2 story books.
Altogether, there are 12 story books.
How many books are on the shelf?

- 10 The clocks show the time that Max leaves home and the time he arrives at the swimming pool.

leaves home



arrives at swimming pool



How long is Max's journey from home to the swimming pool?