Unit 13 Lines and angles

Lines, segments and rays

Remember:

A **line** is a group of points on a straight path. It can go on and on forever.

This line is called line $\overleftrightarrow{XY}$

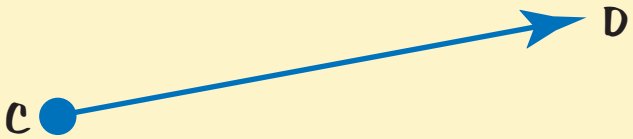
A **line segment** is a part of a line that has two end points.

This line segment is called segment $\overline{AB}$

A and B are the two end points.
This line segment is 4 centimetres in length. Line segments can be measured because they have two end points.

A **ray** is part of a line. It has one end point and the other end goes on and on forever. A ray is named with its end point first followed by any other point on the ray.

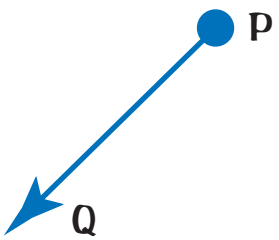
This ray is called ray $\overrightarrow{CD}$.
C is the one end point.



1 Are these lines, line segments or rays?
Use the letters to name them.

a)

b)

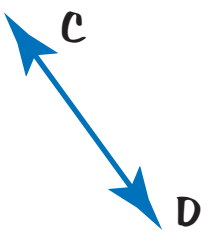


c)

d)

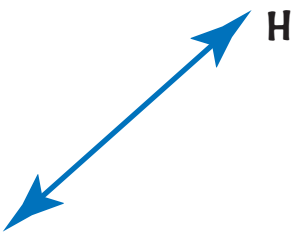
e)

f)



g)

h)



2 Measure the lengths of these line segments. Use a ruler.

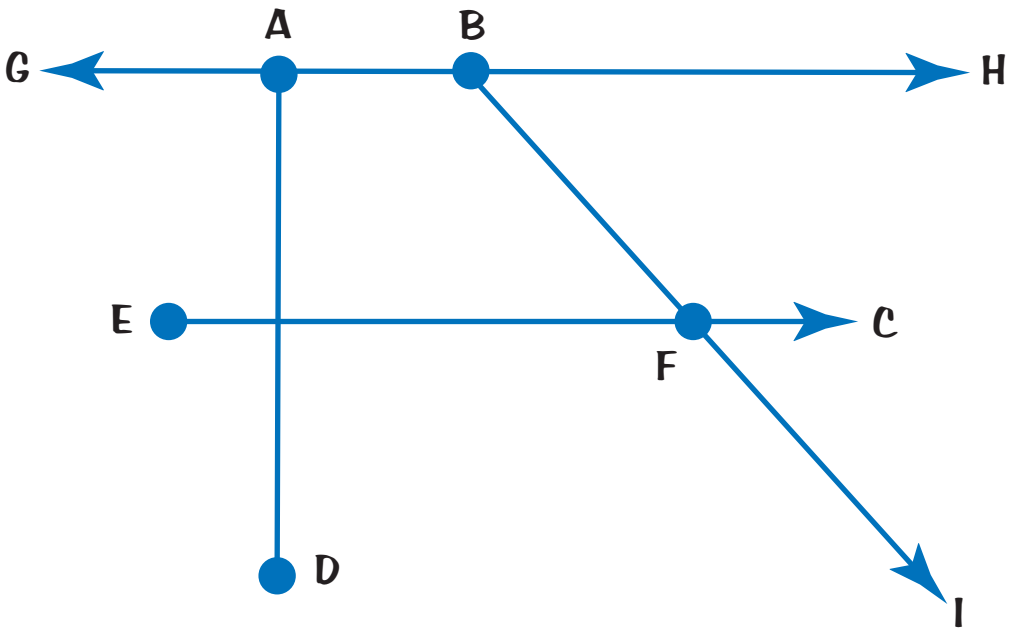
a) C D

b) E F

c) G H

d) K L

3



a) Name one line. _____

b) Name two line segments. _____

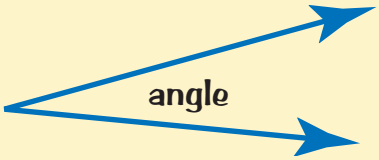
c) Name two rays. _____

Try this

What do you make if you cut a line in half?
What do you make if you cut a line segment in half?
What do you make if you cut a ray in half?

Angles and turning

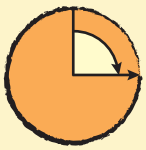
When two lines meet at an end point they make an **angle**.



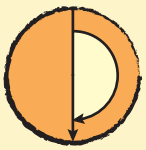
Use two rulers or sticks.
Keep one pair of ends together.
Move the other ends apart to make different angles.
Compare the different angles you can make.

Angles are measures of turn.

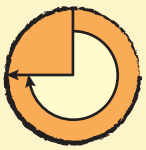
1
Complete turn



$\frac{1}{4}$
Quarter turn

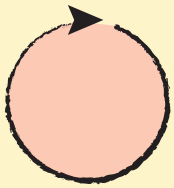


$\frac{1}{2}$
Half turn

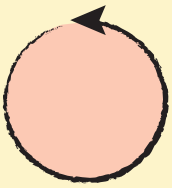


$\frac{3}{4}$
Three-quarter turn

You can turn clockwise (in the direction of clock hands) or anticlockwise.

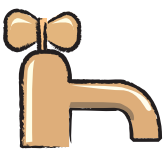


Clockwise



Anticlockwise

1 Write clockwise or anticlockwise to show the turn.

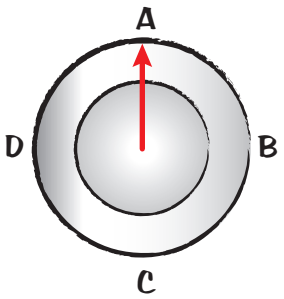
a)  turn a tap on _____

b)  open this door _____

c)  take off a bottle cap _____

d)  turn the sound up _____

2 This dial has four positions. They are A, B, C and D.



Complete the chart. Show the start and finish positions for each turn.

Start position	Turn	End position
A	$\frac{1}{4}$ turn clockwise	B
A	$\frac{3}{4}$ turn clockwise	
B	$\frac{1}{4}$ turn anticlockwise	
C	$\frac{1}{4}$ turn clockwise	
D	$\frac{1}{2}$ turn anticlockwise	
D	$\frac{1}{4}$ turn clockwise	
B	$\frac{1}{4}$ turn anticlockwise	
C	$\frac{3}{4}$ turn anticlockwise	

Try this

Stand and face the front of the room. Follow these instructions.

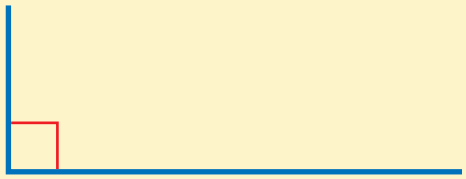
1 Make a $\frac{1}{4}$ turn clockwise.
2 Make a $\frac{1}{2}$ turn anticlockwise.
3 Make a $\frac{1}{4}$ turn anticlockwise.
4 Make a $\frac{1}{2}$ turn clockwise.
5 Make a full turn anticlockwise.

Which way are you facing?

Make up some more instructions for a friend to follow.

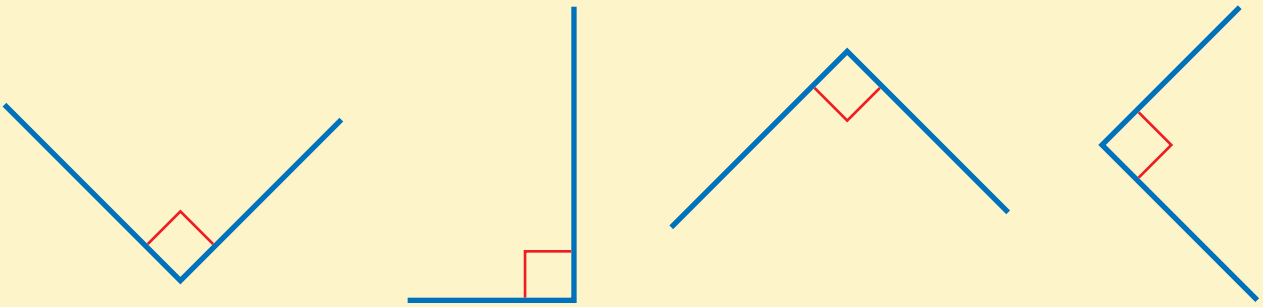
Right angles

This is a square corner.



It is called a right angle.
Look for shapes around you that have right angles.

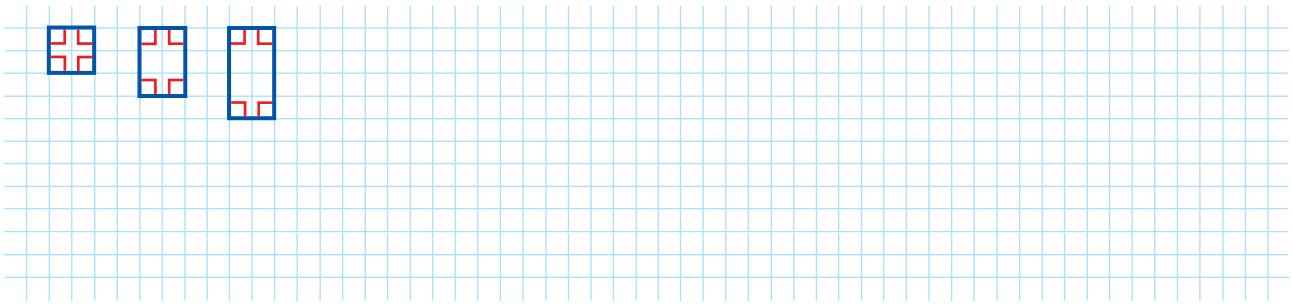
Right angles can be in any position, not just on the right!



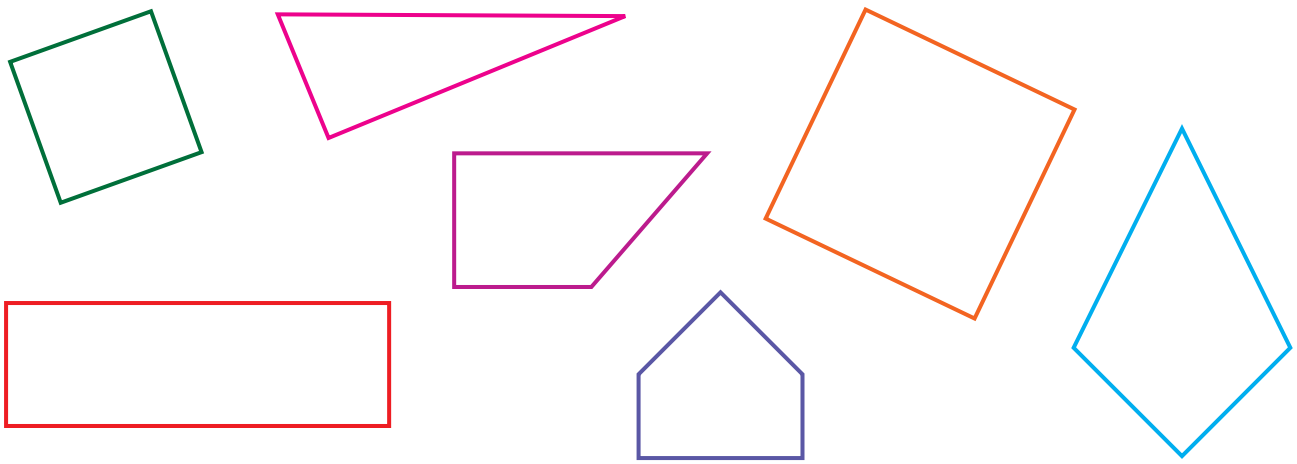
1 Draw 5 right angles with your pencil and ruler.

2 Continue this pattern.

3 Continue this pattern.

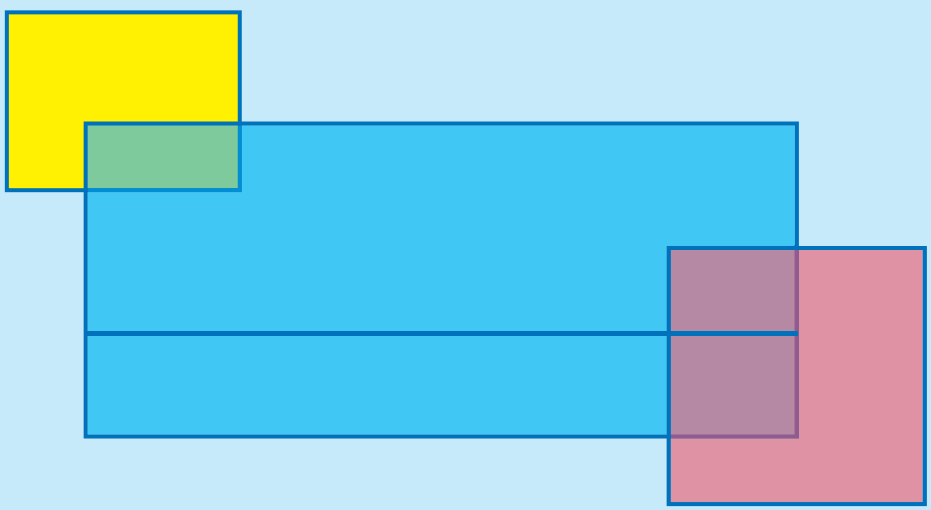


4 Look at these shapes. Mark the right angles.

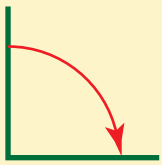


Try this

How many right angles can you see on this shape?



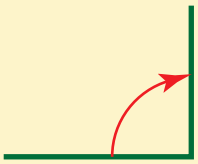
Types of angles



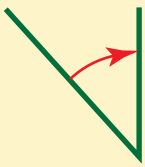
A $\frac{1}{4}$ turn is also called a right angle.

A complete turn is the same as four right angles.

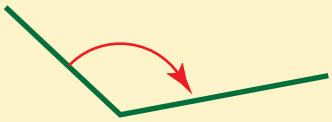
Try to recognise these three types of angle.



Right angle

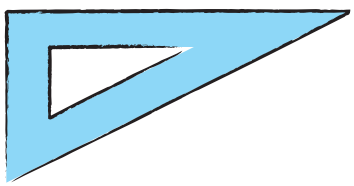


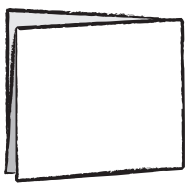
Acute angle
Less than a right angle



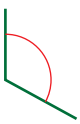
Obtuse angle
Between a right angle and a straight line

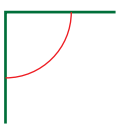
1 Use a set square or a square corner made from folded paper.

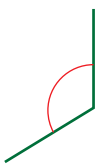


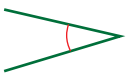


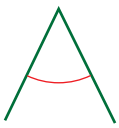
Name each angle as an acute angle, an obtuse angle or a right angle.

a)  _____

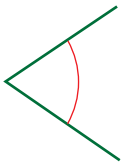
b)  _____

c)  _____

d)  _____

e)  _____

f)  _____

g)  _____

h)  _____

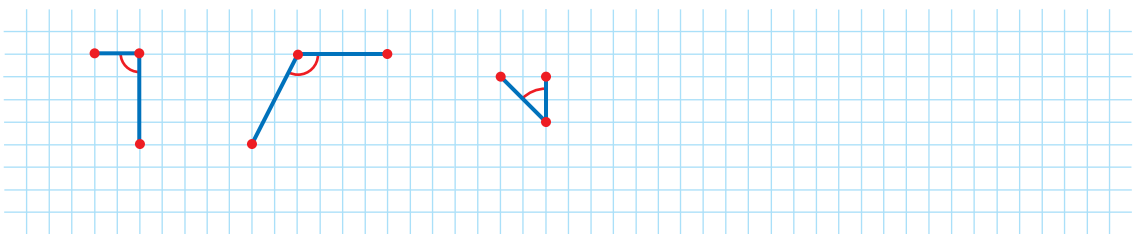
2 Draw these angles. Follow the instructions.

a) Draw a line segment 5 cm long.
Draw another 5 cm line segment from an end point to make an acute angle.

b) Draw a line segment 4 cm long.
Draw a 3 cm line segment from an end point to make an obtuse angle.

c) Draw a line segment 6 cm long.
Draw another 6 cm line segment from one end point to make a right angle.
Use your square corner to help you measure a right angle.

3 These angles have been made by joining three dots.



Join three dots on these grids. Make different angles of each type.

Right angles

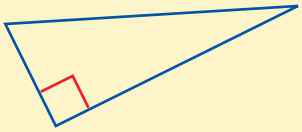
Obtuse angles

Acute angles

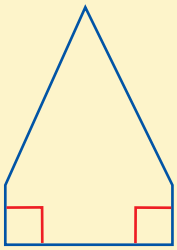
Angles and shapes

When lines meet to make shapes, different angles are made at each corner.

This has a right angle and two acute angles.



This has two right angles, two obtuse angles and an acute angle.



1 Look at each shape. Write the number of acute angles, obtuse angles and right angles.

a)

☐ acute

☐ obtuse

☐ right

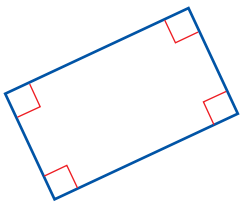
b)

☐ acute

☐ obtuse

☐ right

c)

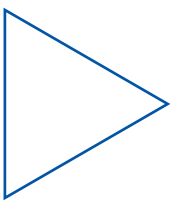


☐ acute

☐ obtuse

☐ right

d)

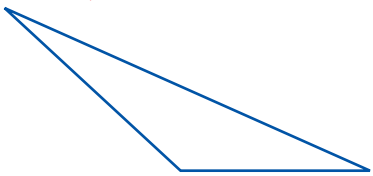


☐ acute

☐ obtuse

☐ right

e)



☐ acute

☐ obtuse

☐ right

f)

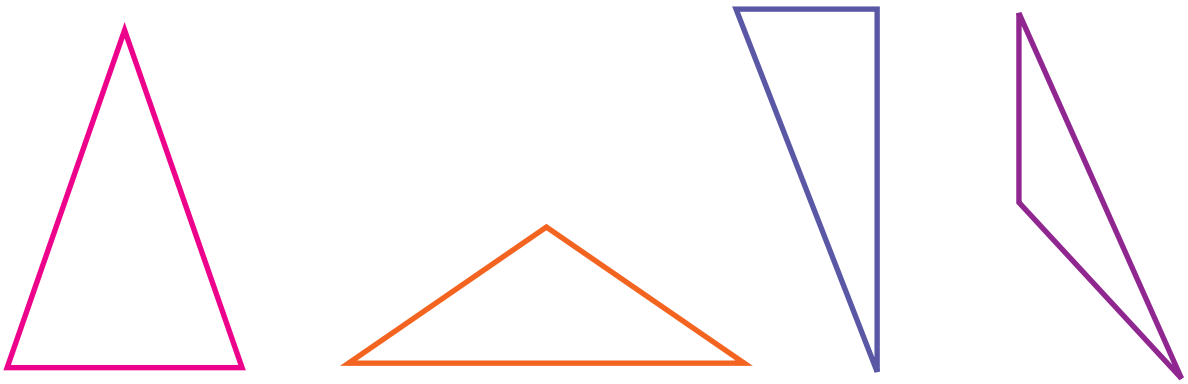
☐ acute

☐ obtuse

☐ right

2 Look at the triangles. Put a coloured dot to show each type of angle.

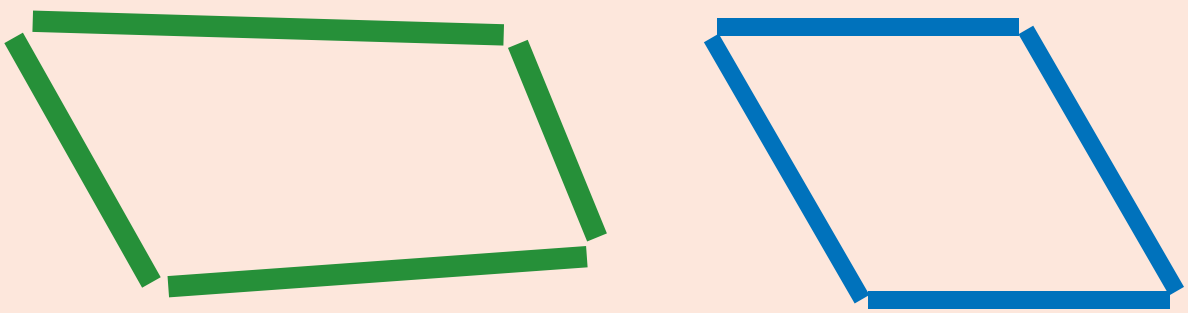
● acute angle ● obtuse angle ● right angle



Assessment

Cut out four strips of card that are **different** lengths.
Cut out four strips of card that are the **same** length.

Put them together to make different shapes with four sides.
Explore the different angles you can make by joining four strips.



How many right angles can you make in a shape?
How many acute angles?
How many obtuse angles?