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Maths

Entry Level 3, Book 9

GLH 3

Shape and Space

Name	
Number	
Location	
Date Issued	



➤ Introduction

This booklet is part of your learning programme.

Remember to read carefully and try your best. Don't worry if you get stuck, make a note on the booklet and move on to the next task. Try coming back to it later, see if you can work it out then.

If you are still stuck, remember to make a note at the end of the booklet.

Throughout the booklet, you will see that some words have been printed **blue and bold**. You will find more detailed explanations of each of these words in the 'Glossary' at the back of the booklet.



Glossary is a list of often difficult or specialised words with their definitions, placed at the back of a book. You may also know this as a word bank.

In this booklet, you will learn about 2D and 3D shapes and their properties, including lines of symmetry and angles.

You will also look at ways to describe position and direction, including compass points and clockwise and anticlockwise turns.

These are very useful skills. If you were lost for example, by being able to give someone your precise location, they would be able to find you or direct you home. Many jobs require a good understanding of directions. Can you think of some?

What Do the Symbols in this Booklet Mean?



Where you see this symbol, there is a skills practice or activity for you to complete.



Information, explanations and case studies are shown with this icon.



This shows you there is a glossary or word bank with the meaning and correct spelling of key words.



This icon shows where to write comments for your tutor to read.



This symbol lets you know there are some key points to remember.




The Big Picture



You are studying Entry Level 3 Maths, which is taught over 55 Guided Learning Hours (GLH).

The programme covers the units listed below. The unit that you're working on today is ticked.

Booklet		GLH	
1	Place Value and Sequencing		
2	Addition and Subtraction		
3	Multiplication		
4	Division		
5	Fractions		
6	Decimals and Money		
7	Rounding		
8	Time		
9	Shape and Space	3	
10	Measure		
11	Handling Data		
12	Recap and Summary		

Outcomes

These are the outcomes you can achieve by completing the learning activities in this booklet.

1

Sort 2D and 3D shapes using properties such as lines of **symmetry**, length, right angles and number of angles, including rectangles and triangles.

2

Use appropriate positional **vocabulary** to describe position and direction, including eight compass points and full/half/quarter turns.



Recap



A **recap** is an effective way of helping you to remember and apply what you have learnt. If this is your first booklet, it may help you to think about what you know already about this subject. Can you answer the following questions?



What was the last booklet you completed?



Can you remember what you learnt about?



Can you remember three key points from the booklet?

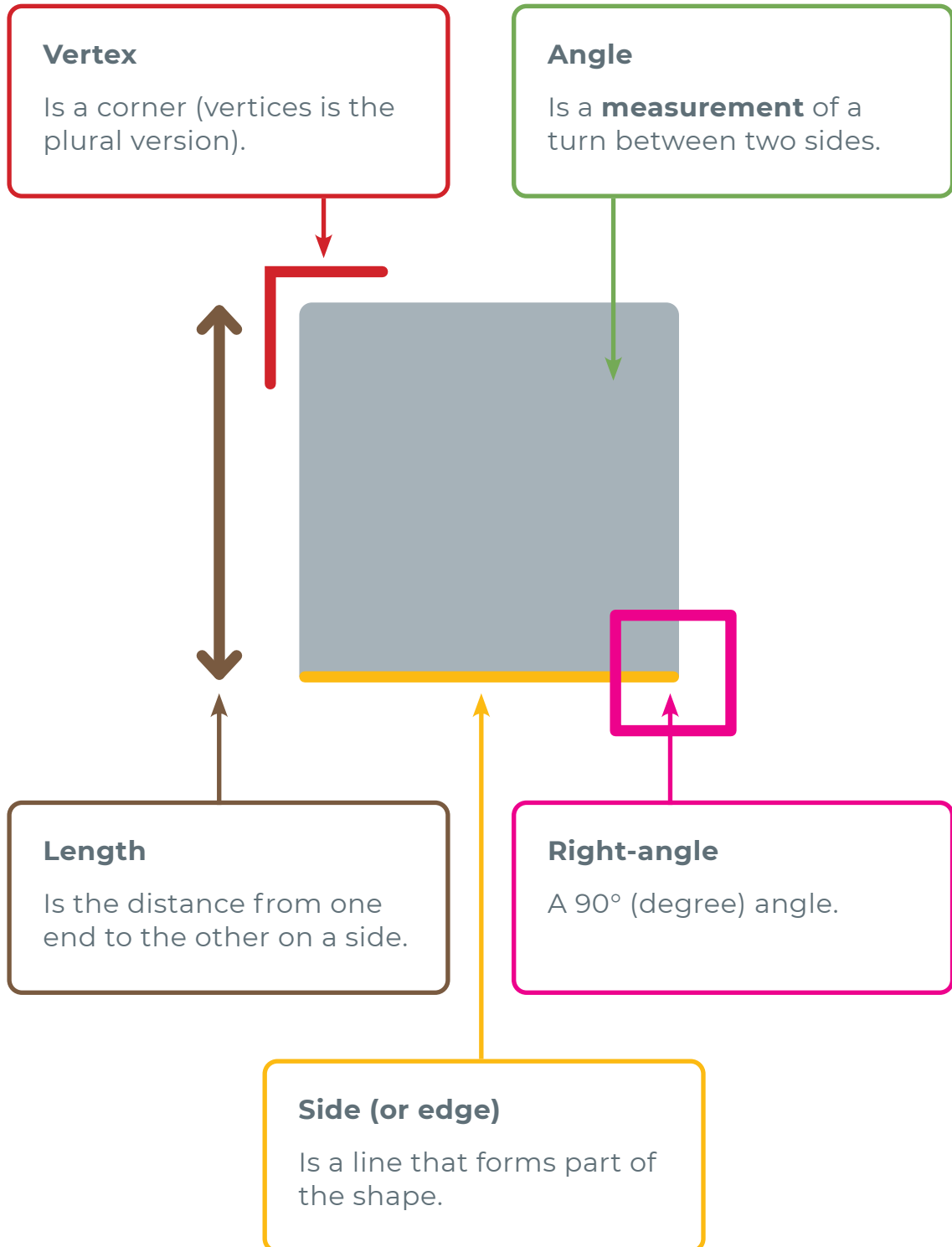
1

2

3

Things to Know

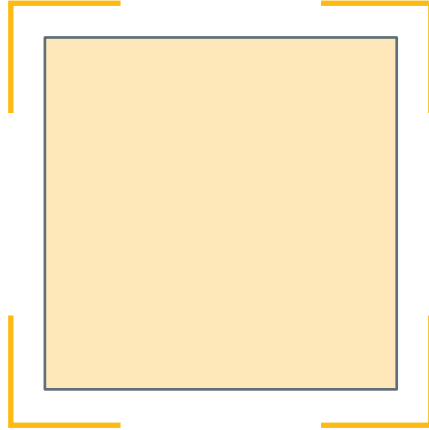
When looking at shapes, we use terms that are not very common (such as vertices). This section will explain the terms you need to know and give examples of each one.



Vertex

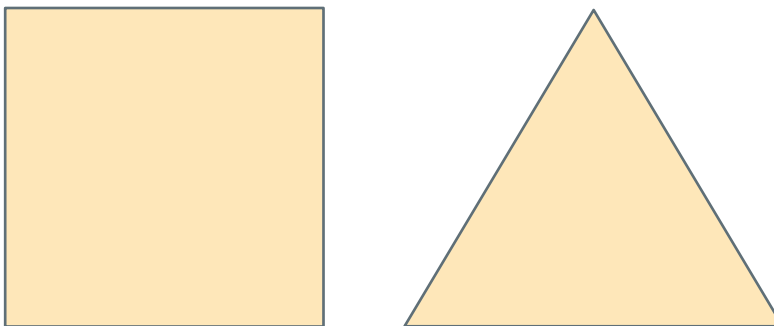
Let's look at this in more detail:

A square has **4 corners**. This means it has **4 vertices**.



Sides

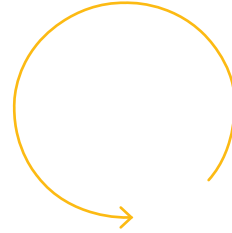
A square has **4 sides**. A triangle has **3 sides**. Each of the sides will have a length, which can be measured in millimetres, centimetres or metres.



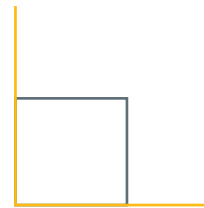
Angles

- An angle is a measurement of a turn.
- It is measured in degrees, with the symbol $^{\circ}$ used.
- You can use a protractor to work out the sizes of angles.

There are 360° in a full turn.



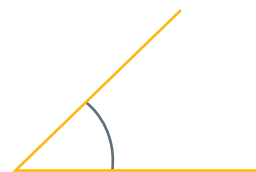
An angle of exactly 90° is called a right-angle. This is a quarter of a full turn. We use a black box shape to represent a right angle.



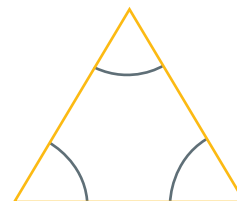
For example, this square has 4 right angles.



An angle less than 90° is called an acute angle. We use a curved line on the angle to represent how much of a full turn has been made.



For example, this triangle has 3 acute angles.



Angles

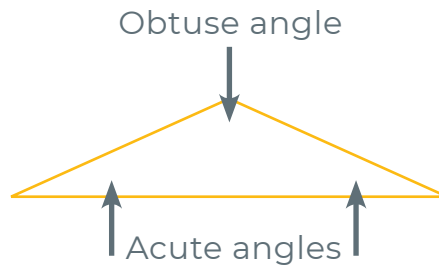
This represents what an angle of 180° would look like. It makes a straight line, which is half a full turn.



An angle between 90° and 180° is called an obtuse angle.



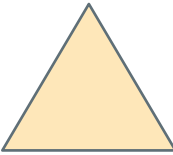

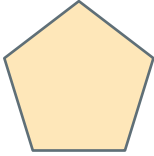
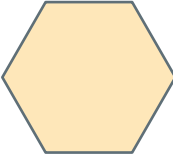
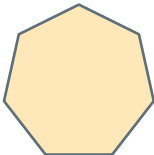
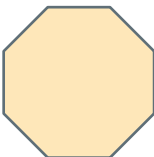
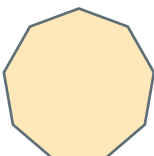
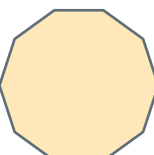
This triangle has 1 obtuse angle and 2 acute angles.



An angle greater than 180° is called a reflex angle. You can see the curved black line is getting bigger as the angles increase in size. We use a curved line on the angle to represent how much of a full turn has been made.



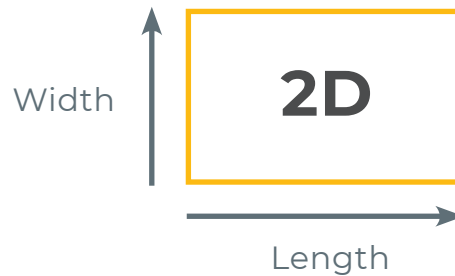
Shape Names

Number of Sides	Name of Shape	Image
3	Triangle	
4	Quadrilateral	
5	Pentagon	
6	Hexagon	
7	Heptagon	
8	Octagon	
9	Nonagon	
10	Decagon	



➤ Dimensions – What Does 2D Mean?

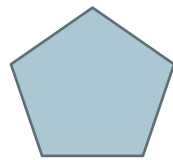
2D stands for two-dimensional. It means that an object is flat, it has no depth. It only has a length and a width.



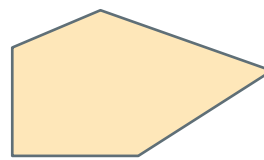
2D Shapes

Many shapes are 2D, such as squares and circles, however they can be separated into two categories: regular and irregular.

A regular shape has angles that are all the same size and sides that are all the same length.



Regular
Pentagon



Irregular
Pentagon

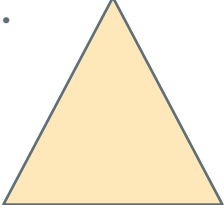
Both of these shapes are pentagons because they have 5 sides. However, the blue shape is a regular pentagon as all the sides are the same length and all the angles are the same size. The yellow shape has different length sides and angles so is irregular. Only one length or angle needs to be different from the others for a shape to be irregular.

Regular or Irregular?

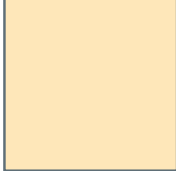


Task
1


Which shapes are regular, and which are irregular? Tick **R** for regular and **I** for irregular.

1. 

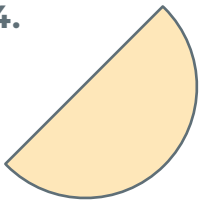
R	I
---	---

2. 

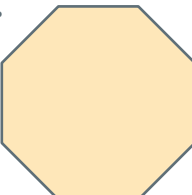
R	I
---	---

3. 

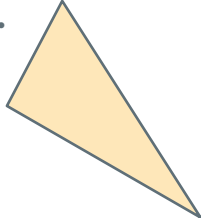
R	I
---	---

4. 

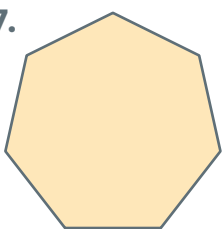
R	I
---	---

5. 

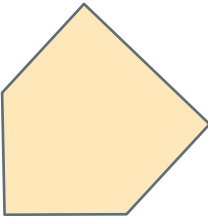
R	I
---	---

6. 

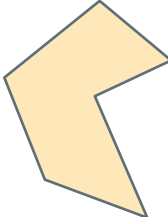
R	I
---	---

7. 

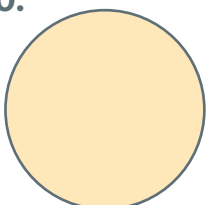
R	I
---	---

8. 

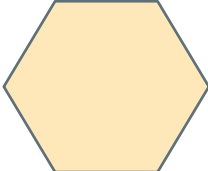
R	I
---	---

9. 


R	I
---	---

10. 

R	I
---	---

11. 

R	I
---	---

12. 

R	I
---	---

Shapes



Task 2

Can you draw these shapes from their descriptions?

You can draw regular or irregular shapes.

Name of shape	Number of sides	Draw your shape here
Triangle	3	
Pentagon	5	
Hexagon	6	
Heptagon	7	
Octagon	8	

Notes





Notes



Let's keep going

ROW

Feedback



WWW (What Went Well)

EBI (Even Better If)

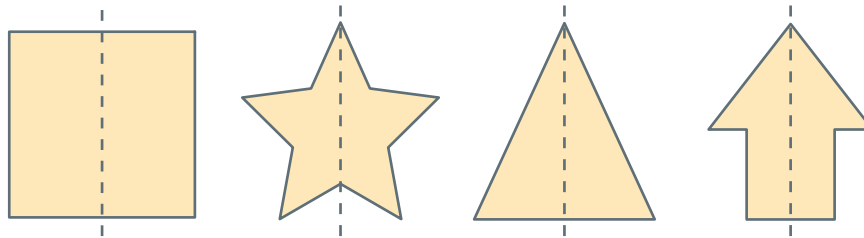
Next steps

Learner feedback (Please provide some feedback for your tutor following the comments that you have just made on your work.)

Symmetry

Symmetry is when one half of a shape or object is the mirror image of the other half. A line of symmetry is the point where if you put a mirror against a shape, the reflection would create the same complete image.

These shapes have lines of symmetry. The dotted lines show where these lines are:



Task
3

Complete the other half of these symmetrical shapes.

The first shape has been done as an example.

1.

2.

3.

4.

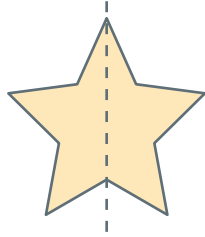
5.

6.

7.

Asymmetry

Asymmetry is when a shape has no lines of symmetry.



Symmetrical



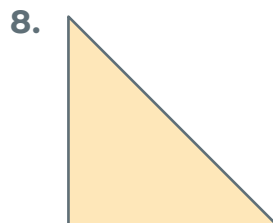
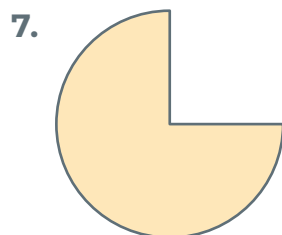
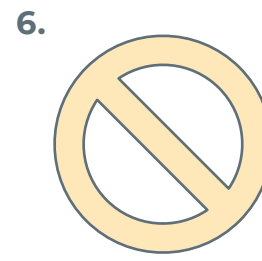
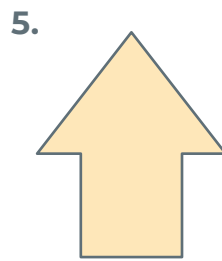
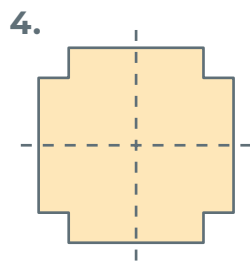
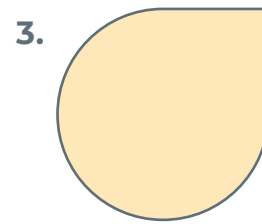
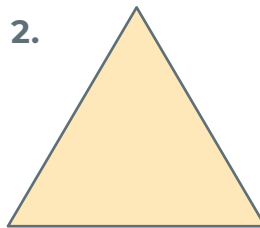
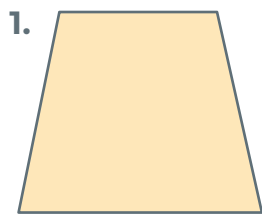
Asymmetrical



Task
4

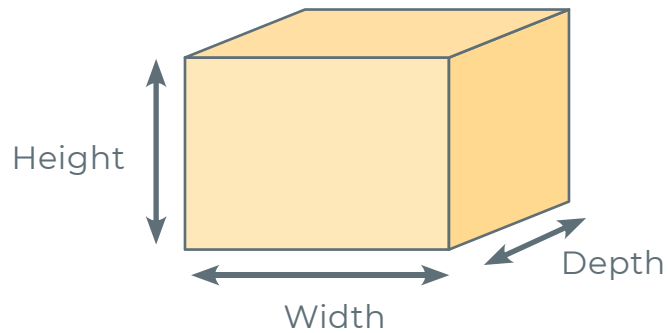
Draw the lines of symmetry on these shapes.

Some shapes can have more than one line of symmetry. An example of this has been shown on one of the shapes.

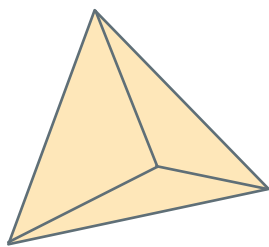


Dimensions – What Does 3D Mean?

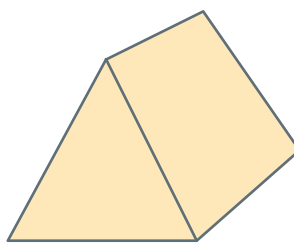
3D stands for three-dimensional. It means a shape has three different dimensions, e.g. height, width and depth.



Names of some common 3D shapes:



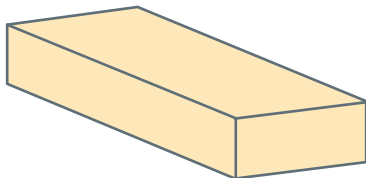
Triangle-based pyramid



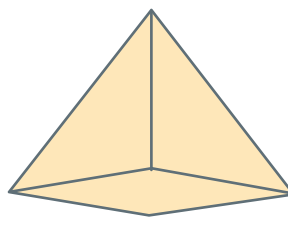
Triangular prism



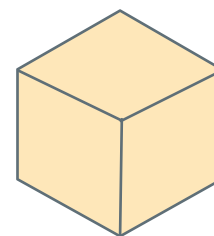
Cone



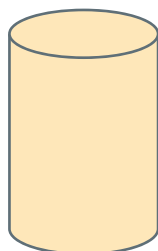
Cuboid



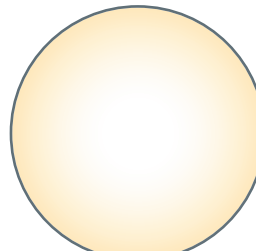
Square-based pyramid



Cube



Cylinder



Sphere

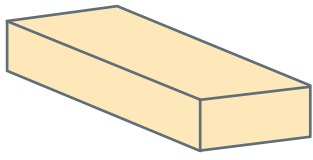
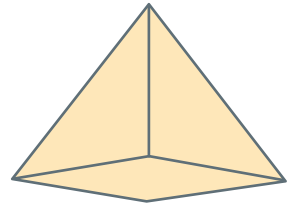
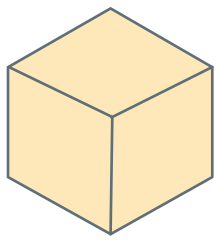
Dimensions – 3D

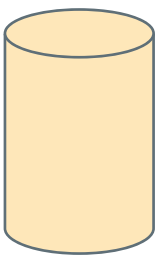
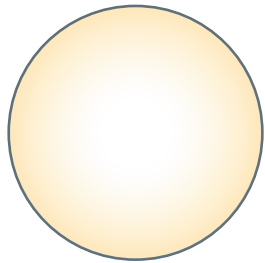


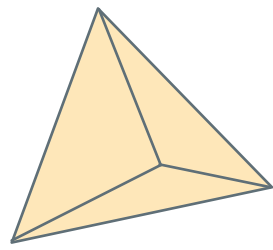
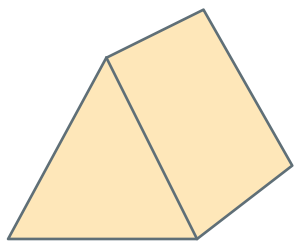
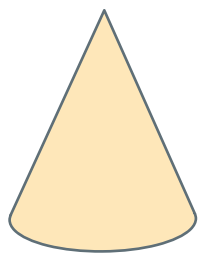
Task
5

Match the names from the list to the shapes. What can you remember? If you get stuck, look back at page 23 for help.

- Cuboid
- Square-based pyramid
- Cube
- Triangle-based pyramid
- Triangular prism
- Cone
- Sphere
- Cylinder

1.  2.  3. 

4.  5. 

6.  7.  8. 

Recap

In this booklet you have looked at:

Angles	✓
A range of 2D or flat shapes.	✓
The difference between regular and irregular shapes.	✓
Symmetry	✓
Asymmetry	✓
A range of 3D shapes	✓



Task
6

What can you remember? Have a go at answering these questions:

1. How many degrees are in a full turn?
2. What is an angle of 90° commonly known as?
3. Describe symmetry in your words:
4. What is the difference between a regular and an irregular shape?
5. Is this shape 3D or 2D?

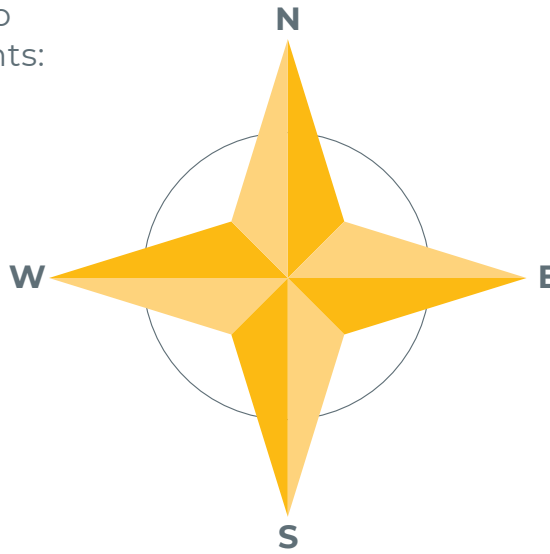


Directions

In maths, directions are used to tell us which way something is pointing or moving. We generally tend to use the compass points as directions as they are universally used around the world.

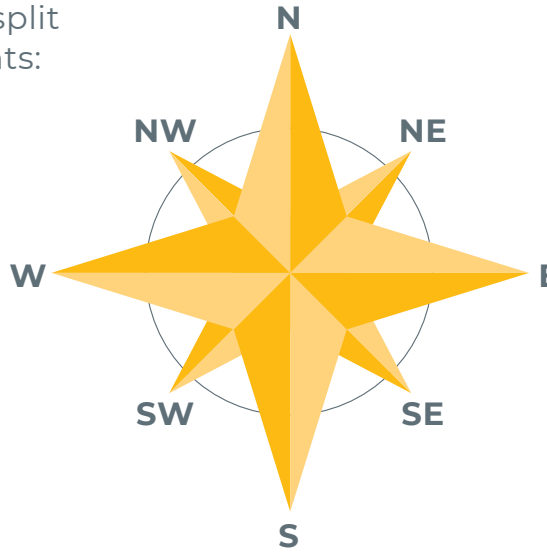
The compass is split into four main compass points:

- North **N**
- South **S**
- East **E**
- West **W**



The compass is further split into eight compass points:

- North-East **NE**
- South-East **SE**
- South-West **SW**
- North-West **NW**



Task
7

Do you know which part of the country you live in?

.....

.....

Directions



Task
8

Fill in the gaps about the compass. Try not to look back.

1. NW stands for
2. SE stands for
3. stands for South-West
4. stands for North-East

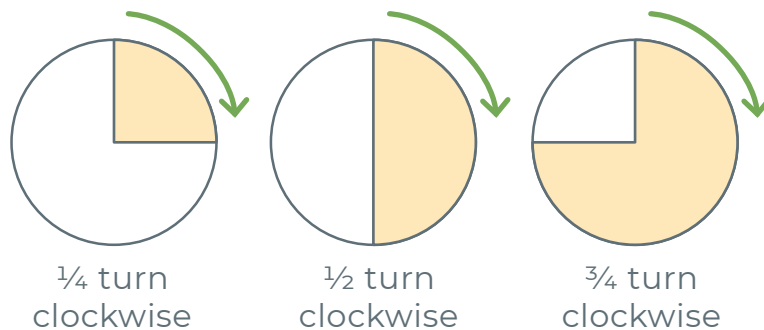
More Directions – Clockwise / Anti-clockwise

As well as using the compass points, we also use clockwise and anti-clockwise to describe which direction we are turning in.

A **clockwise** direction follows the way a clock turns.

An **anti-clockwise** direction is simply the opposite way.

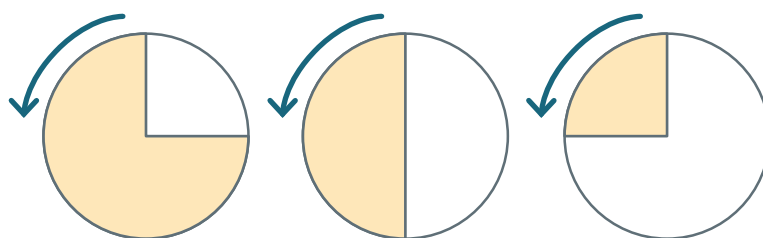
Anti-clockwise Clockwise



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

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

$\frac{3}{4}$ turn
clockwise



$\frac{3}{4}$ turn
anti-clockwise

$\frac{1}{2}$ turn
anti-clockwise

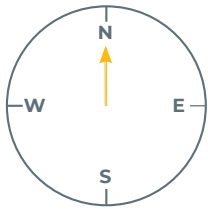
$\frac{1}{4}$ turn
anti-clockwise

Directions – Clockwise / Anti-clockwise

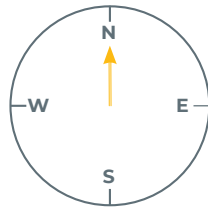


Task
9

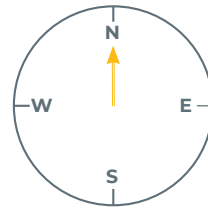
1. I am facing North and make a $\frac{1}{2}$ turn clockwise, where am I facing now?



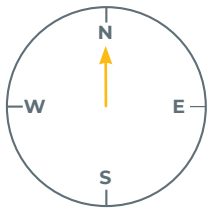
2. I am facing North and make a $\frac{1}{4}$ turn clockwise, where am I facing now?



3. I am facing North and make a $\frac{1}{4}$ turn anti-clockwise, where am I facing now?



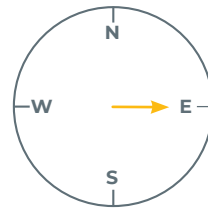
4. I am facing North and make a full turn anti-clockwise, where am I facing now?



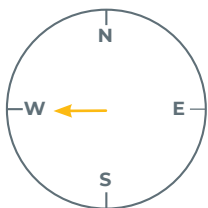
5. I am facing South and make a $\frac{1}{4}$ turn clockwise, where am I facing now?



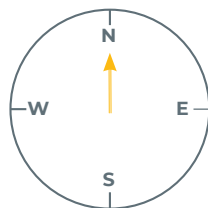
6. I am facing East and make a $\frac{1}{4}$ turn anti-clockwise, where am I facing now?



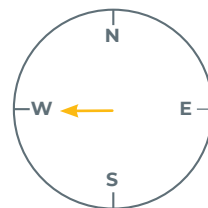
7. I am facing West and make a $\frac{1}{2}$ turn clockwise, where am I facing now?



8. I am facing North and turn clockwise to face West, how far have I turned?



9. I am facing West and turn anti-clockwise to face South, how far have I turned?



Directions – Clockwise / Anti-clockwise



Task
10

Can you label the direction of the blue and green arrows on the clock face, clockwise or anti-clockwise?

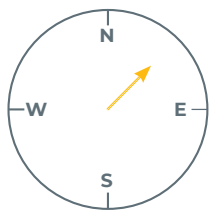


Task
11

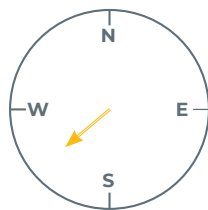
Challenge Activity:

Can you work out the answers to these questions?

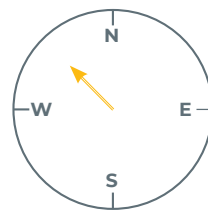
1. I am facing North-East and make a $\frac{1}{2}$ turn clockwise, which way am I facing?



2. I am facing South-West and make a $\frac{1}{4}$ turn anti-clockwise, which way am I facing?

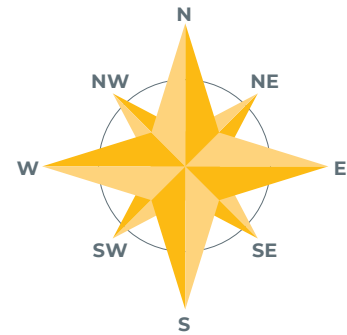
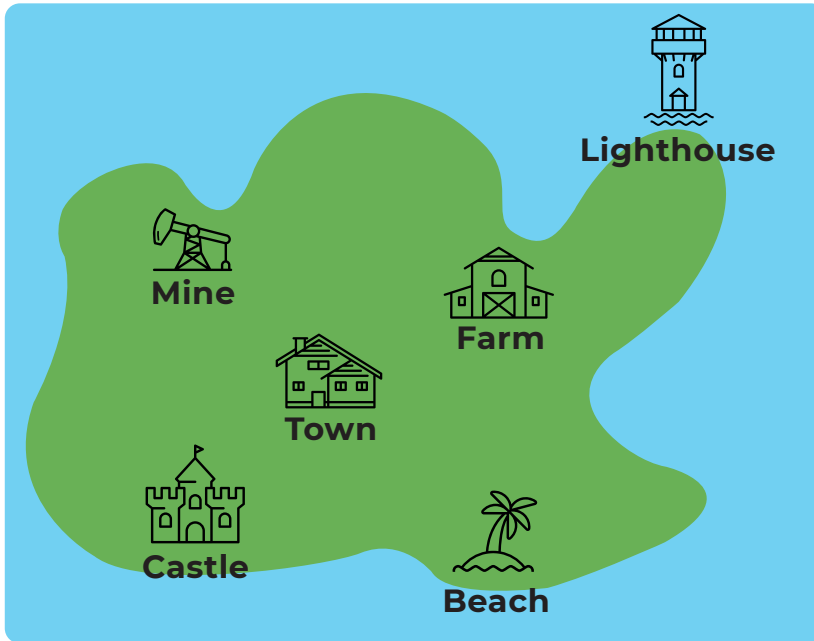


3. I am facing North-West and make a $\frac{1}{8}$ turn clockwise, which way am I facing?



Directions in Practice

Can you work out directions and locations on the map of the island?



Example: What direction is the lighthouse from the town?

Position yourself at the town. Then draw a line to the lighthouse. Look at the compass, what direction would you travel in? The answer is **NE (North-East)**.



Task
12

1. If I walk South-West from the town, what landmark will I see?
2. What direction is the beach from the mine?
3. What direction is the farm from the beach?
4. If I walk North from the town until I reach the sea, then do a quarter turn clockwise, what landmark will I be facing?

Recap

In this booklet you have looked at:

Angles	✓
A range of 2D or flat shapes.	✓
The difference between regular and irregular shapes.	✓
Symmetry and asymmetry	✓
3D shapes	✓
Directions	✓
Clockwise	✓
Anti-clockwise	✓



Glossary



Asymmetry	Asymmetry is the absence of symmetry. In other words, a shape which has no lines of symmetry.
Symmetry	Symmetry is when one half of a shape or object is the mirror image of the other half.
Vocabulary	Words used by or known to a particular people or group.

Next Steps

Now you have completed Booklet 9, please return this to your tutor/trainer.

Your tutor/trainer will mark the work and provide you with some feedback showing what you have done well and suggestions on improvements.

The next booklet will be provided to you.





WWW (What Went Well)

EBI (Even Better If)

Next steps

Learner feedback (Please provide some feedback for your tutor following the comments that you have just made on your work.)

Have Your Say



We would be interested in your opinion of this booklet.

- 1. Was there anything you found easy in this workbook?** Yes No
If you answered yes, what did you find easy?

- 2. Was there anything you found hard?** Yes No
If you answered yes, what did you find hard?

- 3. Is there anything that you would like your tutor to go over again?** Yes No
If you answered yes, what is this?

- 4. If your tutor provided learning aids, did you use them?** Yes No
If you answered yes, how were they useful?

- 5. Would you like more support?** Yes No
If you answered yes, one of our Support Staff will get in touch with you.

- 6. Do you have any questions?**

- 7. What have you learnt from this booklet?**



Notes





Notes



