Stewards Academy

Maths Spring 1

Year 7

Blended Learning Booklet

Name:

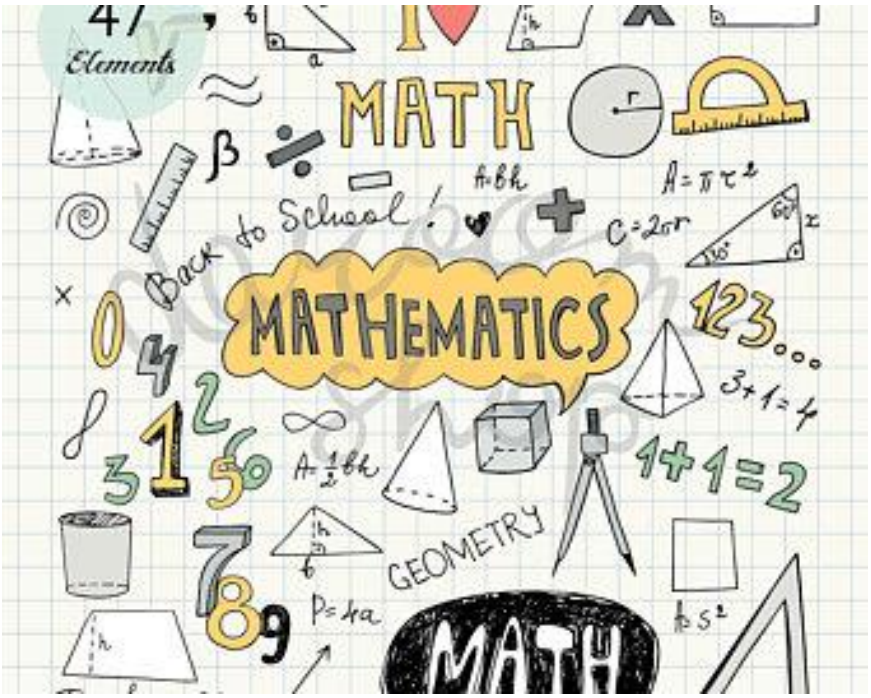
Form:

Each week covers topics you would complete in your 3 Maths lessons that week. Write out the title and LI and then complete the tasks.

All video links are online using the ClassCharts link.

The Knowledge Organiser on page 4 has further practice questions and page numbers linking to your pocket revision guides for all the key information and examples to help you with this unit.

Upload all work onto ClassCharts for feedback.



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Contents

Other useful information/websites

The school login for MyMaths.co.uk is

stewards

The password is

triangle

Every topic in this booklet is covered on MyMaths.co.uk in the online lessons for further support at home.

You also have a study guide (the pages you can use for each section are on your Knowledge Organiser – page 4)

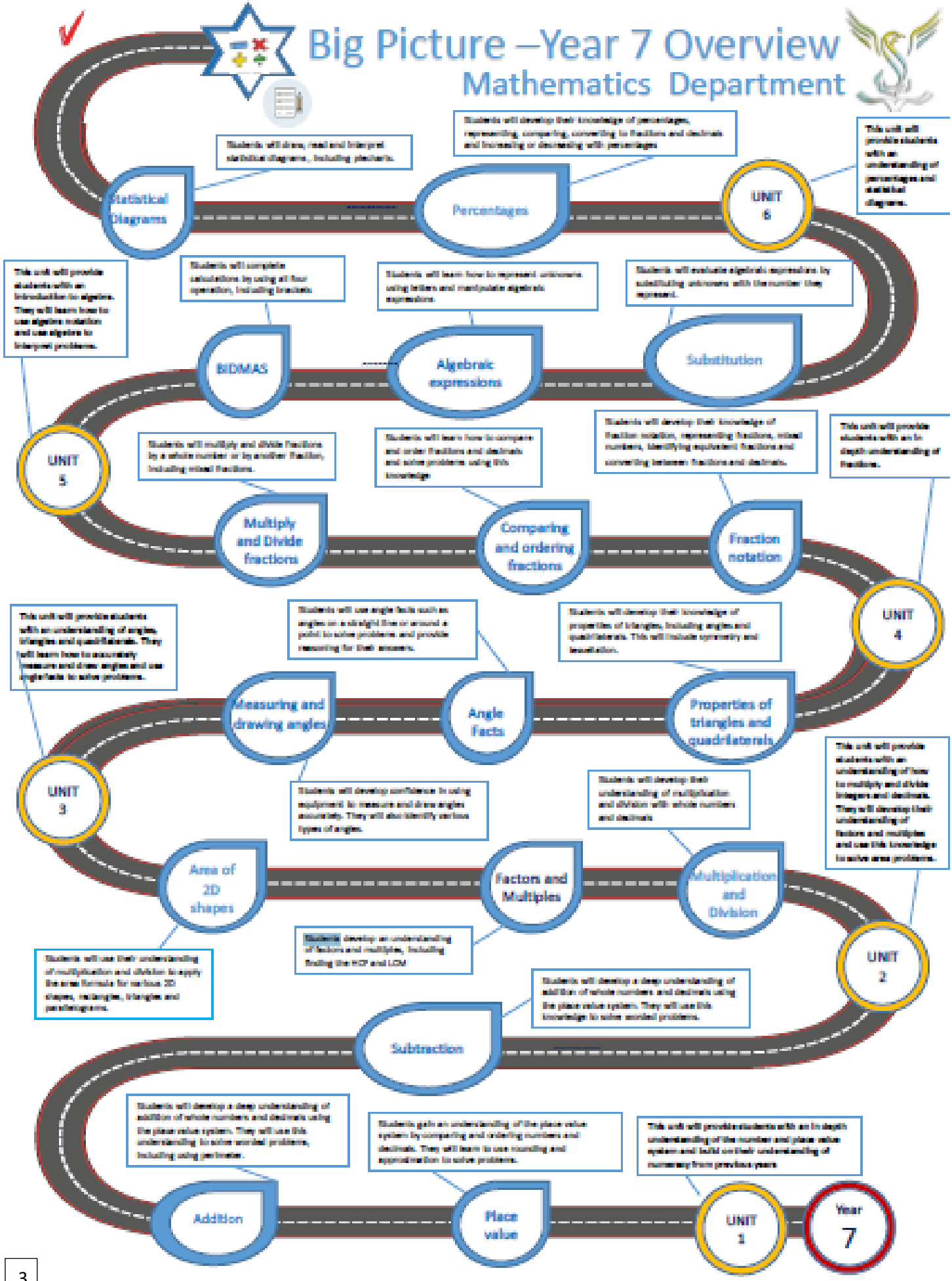
Other websites you can look up information from include:

Oak National Academy

BBC Bitesize

MathisFun.com

Mathsgenie


Big Picture –Year 7 Overview
Mathematics Department
Statistical Diagrams
Students will draw, read and interpret statistical diagrams, including pie charts.
Percentages
Students will develop their knowledge of percentages, representing, comparing, converting to fractions and decimals and increasing or decreasing with percentages
UNIT 6
This unit will provide students with an understanding of percentages and statistical diagrams.
BIDMAS
Students will complete calculations by using all four operation, including brackets
Algebraic expressions
Students will learn how to represent unknowns using letters and manipulate algebraic expressions
Substitution
Students will evaluate algebraic expressions by substituting unknowns with the number they represent.
This unit will provide students with an introduction to algebra. They will learn how to use algebra notation and use algebra to interpret problems.
UNIT 5
Multiply and Divide fractions
Students will multiply and divide fractions by a whole number or by another fraction, including mixed fractions.
Comparing and ordering fractions
Students will learn how to compare and order fractions and decimals and solve problems using this knowledge
Fraction notation
Students will develop their knowledge of fraction notation, representing fractions, mixed numbers, identifying equivalent fractions and converting between fractions and decimals.
This unit will provide students with an in depth understanding of fractions.
UNIT 4
Measuring and drawing angles
Students will develop confidence in using equipment to measure and draw angles accurately. They will also identify various types of angles.
Angle Facts
Students will use angle facts such as angles on a straight line or around a point to solve problems and provide reasoning for their answers.
Properties of triangles and quadrilaterals
Students will develop their knowledge of properties of triangles, including angles and quadrilaterals. This will include symmetry and tessellation.
This unit will provide students with an understanding of angles, triangles and quadrilaterals. They will learn how to accurately measure and draw angles and use angle facts to solve problems.
UNIT 3
Area of 2D shapes
Students will use their understanding of multiplication and division to apply the area formula for various 2D shapes, rectangles, triangles and parallelograms.
Factors and Multiples
Students develop an understanding of factors and multiples, including finding the HCF and LCM
Multiplication and Division
Students will develop their understanding of multiplication and division with whole numbers and decimals
This unit will provide students with an understanding of how to multiply and divide integers and decimals. They will develop their understanding of factors and multiples and use this knowledge to solve area problems.
UNIT 2
Subtraction
Students will develop a deep understanding of addition of whole numbers and decimals using the place value system. They will use this knowledge to solve worded problems.
Addition
Students will develop a deep understanding of addition of whole numbers and decimals using the place value system. They will use this understanding to solve worded problems, including using per imeter.
Place value
Students gain an understanding of the place value system by comparing and ordering numbers and decimals. They will learn to use rounding and approximation to solve problems.
This unit will provide students with an in depth understanding of the number and place value system and build on their understanding of numeracy from previous years
UNIT 1
Year 7

Year 7 Unit 3

Angles, triangles and quadrilaterals

Revision guide reference pages

Pages 56-57, 68-69,79-80

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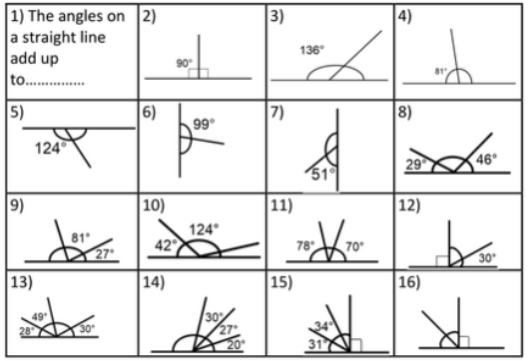
1

1) The angles on a straight line add up to.....



2

I have 4 equal sides.
But none of my angles form a right angle.
What shape am I?

3

Can a Hexagon tesselate?

Can a Circle tesselate?

4

3kg = ... g

7.7kg = ... g

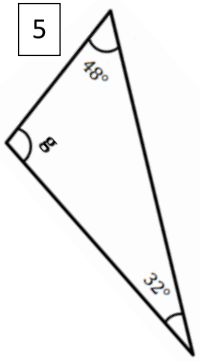
5100g = ... kg

500cm = ... m

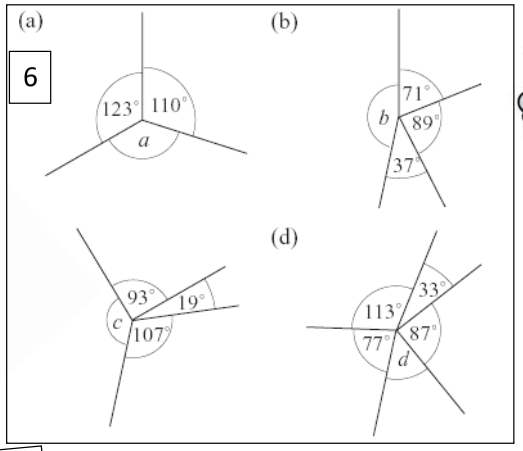
157cm = ... m

0.4m = ... cm

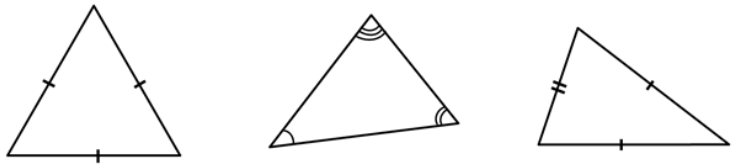
5



6



7 Give the mathematical name for each of these triangles.



8 Construct a triangle that has one angle of 52°, one angle of 37°, and a side of length 8 cm between these two angles.

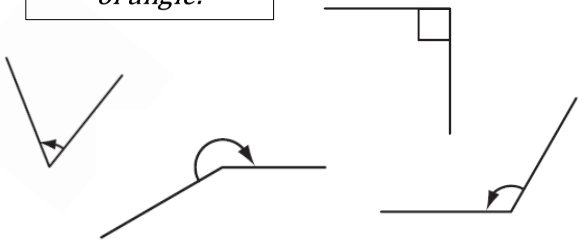
9

Draw an angle that measures:

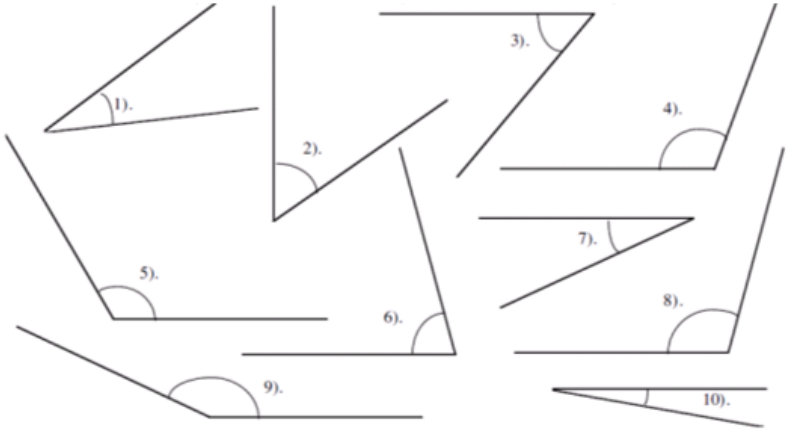
60°	346°
18°	8°
96°	165°
137°	74°
242°	212°

10

Identify the type of angle:



11 Use a protractor to measure these angles accurately



12 Construct a triangle that has one angle of 35°, one angle of 48°, and a side of length 6 cm between these two angles.

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Week 1:

- **LI: I can record and order measurements using decimal notation**

Demonstration Video: https://corbettmaths.com/2012/08/10/ordering-decimals-video/

Tasks:

Question 1: Arrange in order from smallest to largest

(a) 3.7, 3.5, 3.9, 3.4, 3.8

(b) 9.2, 2.9, 5.4, 1.8, 8.7

(c) 4.6, 4.9, 14.1, 0.9, 1.2

(d) 8.13, 8.05, 8.24, 8.09, 8.15, 8.02

(e) 1.53, 1.48, 1.59, 1.44, 2.11, 0.98

(f) 0.59, 1.24, 0.45, 1.34, 0.88, 2.01

Question 2: Arrange in order from smallest to largest

(a) 1.2, 1.08, 1.13, 1.6, 1.29

(b) 5.25, 5.2, 5.19, 5.08, 5.1, 5.21

(c) 40.6, 46.1, 40.49, 40.68, 46, 46.09

(d) 0.24, 0.3, 0.125, 0.2, 0.199, 0.18

(e) 0.82, 0.082, 0.9, 0.807, 0.8

(f) 65, 6.5, 0.65, 7.65, 0.076, 7

(g) 0.25, 0.3, 0.2, 0.06, 0.19

(h) 7.81, 7.49, 7.9, 7.007, 7.1, 7.107

(i) 10.083, 10.08, 10.009, 10.56, 10.3

(j) 0.342, 0.075, 0.256, 0.34, 0.6, 0.4

Question 3: Place the correct sign, < or > between the following pairs of decimals

(a) 6.3 ☐ 6.7

(b) 0.8 ☐ 0.5

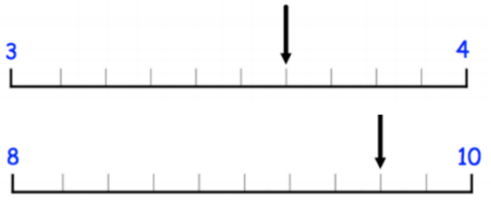
(c) 2.2 ☐ 2.15

(d) 8.21 ☐ 8.9

(e) 9.099 ☐ 9.0971

(f) 1.205 ☐ 1.23

1 write the numbers these arrows are pointing to:



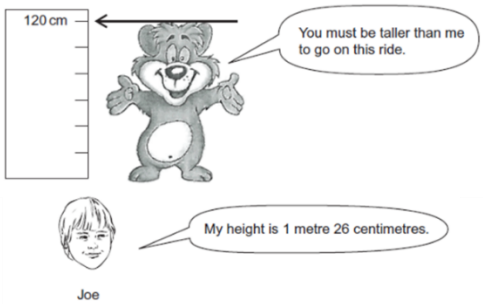
2

Write in ascending order

1. 0.43, 0.429, 0.431
2. 0.501, 0.51, 0.509
3. 0.102, 0.012, 0.201
4. 0.516, 0.056, 0.156
5. 0.11, 0.101, 0.011

3

Here is a sign on a fairground ride.



Is Joe tall enough to go on the ride?
You **must** show your working.

(Total 2 marks)

4 Circle the smaller measurement in each pair.

(a) 5 centimetres 40 millimetres **(1)**

(b) 5 grams 40 kilograms **(1)**

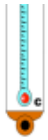
(c) 5 litres 40 centilitres **(1)**

(Total 3 marks)

5 Circle the shortest length.

1200 cm 0.13 km 110 m 140 000 mm

(Total 1 mark)



Question 1: Arrange these temperatures in order, from lowest to highest

(a) 11 °C, 10.8°C, 12.3 °C, 15 °C, 12.7 °C

(b) 8.5 °C, 0.7 °C, −3 °C, 0.9 °C, 6 °C, 1.3 °C, −5.1°C

Question 2: Arrange these amounts of money in order, from highest to lowest.

(a) £6.74, £10, £1.99, £8, £3.30, £2

(b) 80p, £1, £0.09, 23p, £2.75, £0.82, £20

Question 3: The distance of various landmarks from Big Ben are listed below.
Arrange the landmarks in order, from closest to furthest.

London Eye	0.41 miles
Wembley	11.62 miles
Buckingham Palace	0.8 miles
Trafalgar Square	0.63 miles
Hyde Park	2.27 miles
Thorpe Park	24.7 miles

Question 4: Arrange these measurements in order from largest to smallest

(a) 6.2m, 6.077m, 6.31m, 6.19m, 6.4m, 6.009m

(b) 5kg, 800g, 1.2kg, 90g, 0.6kg

Question 5: The heights of seven footballers are listed below.

1.9m, 1.82m, 1.78m, 1.8m, 1.88m, 1.86m, 1.7m

(a) Arrange the heights in order from smallest to largest.

(b) Write down the median height.

(c) A player is picked at random.
Write down the probability that he is over 1.85m.

(The median is the middle number once you have arranged them. The probability is how many fit the criteria out of how many in total)

Question 6: The lengths of time that it takes to complete a jigsaw are below.

0.5 hours, 1.25 hours, 100 minutes, 0.75 hours, 40 minutes,

2 hours, 1.5 hours, 180 minutes, 61 minutes, 0.25 hours.

(a) Arrange the times in order, from quickest to longest.

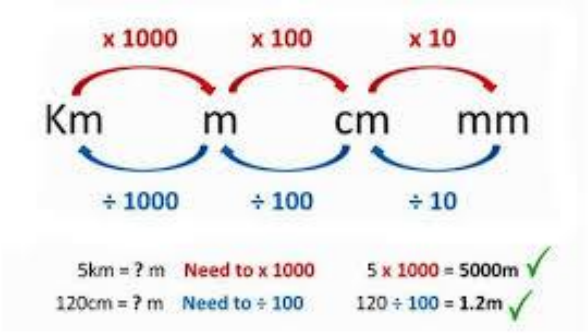
(b) What fraction of the people completed the jigsaw in under 1 hour?

(c) What percentage of people took 2 hours or longer?

Week 1:

- **LI: I can estimate and convert between length in kilometres, metres, centimetres and millimetres**

Demonstration Video: https://corbettmaths.com/2014/01/16/metric-units-for-length/



Task:

Question 1: Convert the following lengths into centimetres (cm)

(a) 4 m (b) 9 m (c) 12 m (d) 59 m

(e) 750 m (f) 105 m (g) 2.5 m (h) 8.2 m

(i) 1.53 m (j) 0.6 m (k) 0.38 m (l) 0.03 m

Question 2: Convert the following lengths into metres (m)

(a) 300 cm (b) 700 cm (c) 900 cm (d) 1400 cm

(e) 250 cm (f) 740 cm (g) 1000 cm (h) 348 cm

(i) 80 cm (j) 70 cm (k) 53 cm (l) 2 cm

Question 3: Convert the following lengths into centimetres (cm)

(a) 60 mm (b) 30 mm (c) 65 mm (d) 87 mm

(e) 280 mm (f) 812 mm (g) 2030 mm (h) 9000 mm

(i) 7 mm (j) 4 mm (k) 1.3 mm (l) 0.6 mm

Question 4: Convert the following lengths into millimetres (mm)

Question 5: Convert the following lengths into metres (m)

(a) 4 km (b) 9 km (c) 13 km (d) 28 km

(e) 125 km (f) 300 km (g) 7000 km (h) 7200 km

(i) 0.5 km (j) 0.8 km (k) 1.2 km (l) 2.6 km

(m) 0.07 km (n) 0.02 km (o) 0.006 km (p) 1.008 km

Question 6: Convert the following lengths into kilometres (km)

(a) 6000 m	(b) 2000 m	(c) 5500 m	(d) 6400 m
(e) 800 m	(f) 600 m	(g) 450 m	(h) 125 m
(i) 70 m	(j) 90 m	(k) 35 m	(l) 4 m
(m) 90000 m	(n) 40000 m	(o) 340000 m	(p) 90530 m

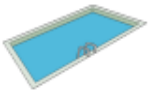
Question 7: Convert the following lengths

(a) 2 m into mm	(b) 8 m into mm	(c) 6500 mm into m
(d) 9000 mm into m	(e) 48000 cm into km	(f) 9250000 cm into km
(g) 780 mm into m	(h) 4km into cm	(i) 1km into mm
(j) 25000000 mm into km	(k) 0.5 km into cm	(l) 0.023km into mm

Circle the most sensible estimate for these:

Height of a two storey house **10m** **20m** **30m** **40m**

Distance from London to Cardiff **2500m** **250km** **2.5km** **25000km**

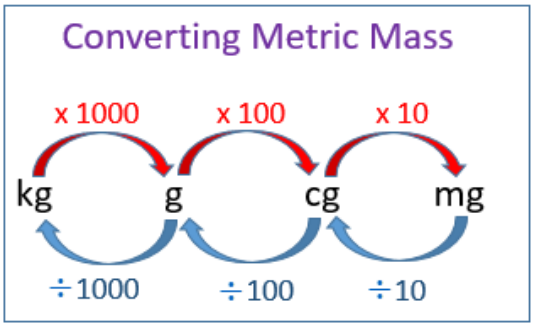


Length of a swimming pool **2.5m** **5m** **25m** **200m**

Week 1:

- **LI: I can estimate and convert between mass in kilograms and grams**

Demonstration Videos: https://www.youtube.com/watch?v=u6SX-BjU2Wg&feature=emb_title



Tasks:

Question 1 Convert the following into grams

(a) 2 kg	(b) 7 kg	(c) 19 kg	(d) 20 kg
(e) 1.5 kg	(f) 2.4 kg	(g) 4.7 kg	(h) 0.5 kg
(i) 0.8 kg	(j) 0.16 kg	(k) 0.03 kg	(l) 0.008 kg

Question 2 Convert the following into kilograms

(a) 7000 g	(b) 3000 g	(c) 12000 g	(d) 40000 g
(e) 3945 g	(f) 600 g	(g) 850 g	(h) 735 g
(i) 60 g	(j) 75 g	(k) 2 g	(l) 78.1 g

Question 3 Convert the following into kilograms

(a) 5 tonnes	(b) 8 tonnes	(c) 15 tonnes	(d) 0.6 tonnes
(e) 1.6 tonnes	(f) 9.25 tonnes	(g) 0.3 tonnes	(h) 0.06 tonnes

Question 4 Karl is baking a loaf of bread and needs 0.8 kg of flour.
He has 72 grams of flour.
How much more flour does Karl need?
Give your answer in grams.

Question 5 A 2p coin has a mass of 7 grams.
Find the total mass of £80 worth of 2p coins.
Give your answer in kilograms.

Question 6 For each of the following, circle the most appropriate estimate.

Mass of a bag of sugar **10g** **100g** **1kg** **10kg**

Mass of an apple **100g** **10g** **1kg** **2kg**

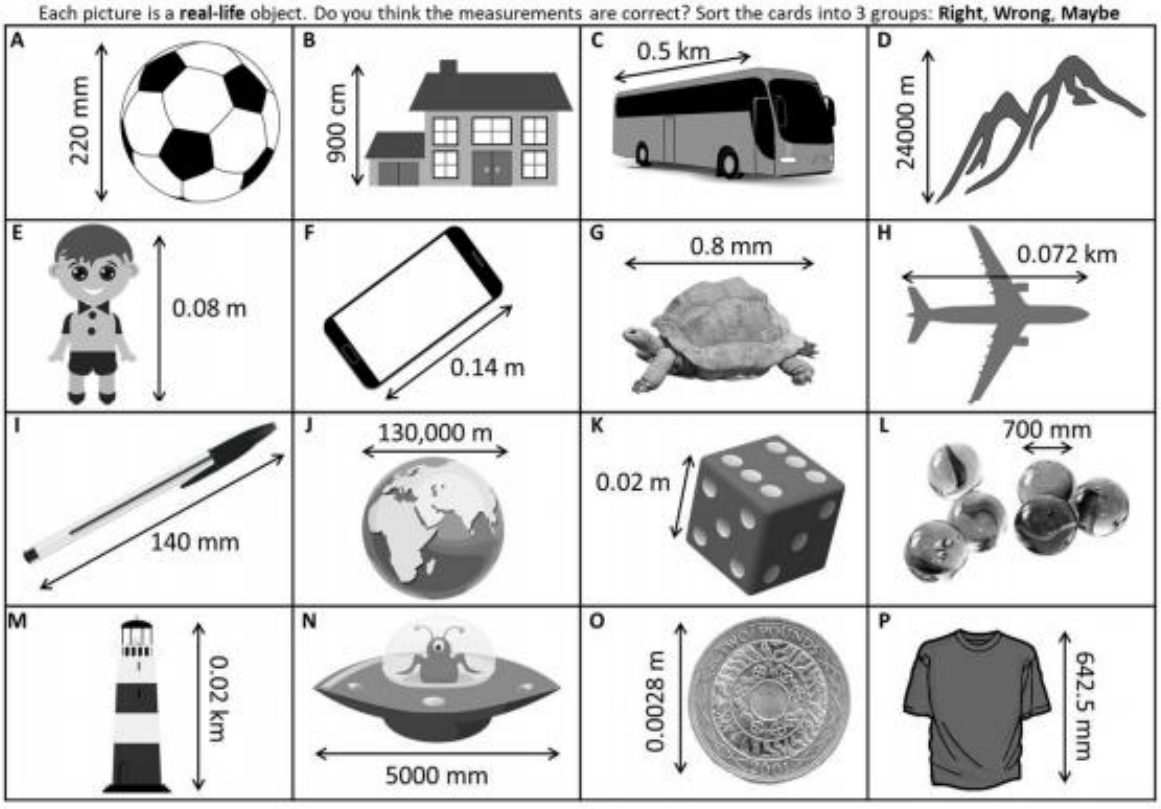
Mass of a woman **7g** **70g** **70kg** **7kg**

Mass of a car **200kg** **1.5 tonnes** **10 tonnes** **1500g**

Mass of a medium sized dog **100kg** **500g** **2kg** **20kg**

Question 7 Rebecca has two dogs, Lucky and Pepe.
Lucky weighs 5.4 kilograms.
Pepe is 800 grams lighter than Lucky.
Work out how much Pepe weighs.
State your units.

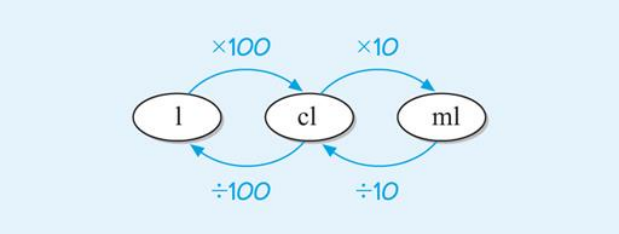
Each picture is a **real-life** object. Do you think the measurements are correct? Sort the cards into 3 groups: **Right**, **Wrong**, **Maybe**



Week 2:

- **LI: I can estimate and convert between volume of liquid in litres and millilitres**

Demonstration Videos: https://youtu.be/zGBN0ofKYpQ



Tasks:

Question 1 Convert the following into millilitres

(a) 2 litres (b) 6 litres (c) 24 litres (d) 1.8 litres

(e) 0.6 litres (f) 0.125 litres (g) 0.07 litres (h) 2.05 litres

Question 2 Convert the following into litres

(a) 8000 ml (b) 3000 ml (c) 76000 ml (d) 750 ml

(e) 540 ml (f) 121 ml (g) 88 ml (h) 1035 ml

Question 3 James and Jack buy a 3 litre carton of orange juice.
Each boy drinks 650 ml of orange juice.
How much orange juice is left?
Give your answer in litres.

4 Change to litres

1) 8000 ml
2) 2400 ml
3) 1350 ml
4) 750 ml
5) 65 ml

5 Change to millilitres

1) 9 litres
2) 8.6 litres
3) 0.775 litres
4) 0.65 litres
5) 0.3 litres

Question 6 For each of the following, circle the most appropriate estimate.

Volume of drink in a large bottle **1L** **2L** **4L** **5L**

Volume of water in a glass **15ml** **1.5L** **150ml** **15L**

Volume of cola in a can **220ml** **330ml** **440ml** **550ml**

Volume of a teaspoon of medicine **0.5ml** **5ml** **50ml** **500ml**

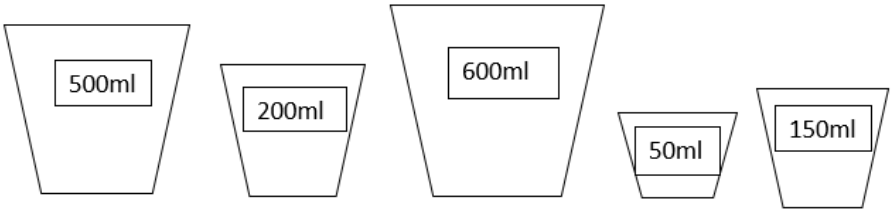
Complete the following

1. 8600 ml = ...litres
2. 80 cl = ...ml
3. 440 ml = ...cl
4. 0.06 litres = ...ml
5. 0.5 cl = ...litres

Challenge Question

Tom wants to fill his bucket. His bucket holds **1 litre of water. That is 1000ml.**

He can use these containers to fill his bucket. He can use each one more than once.



How many **different** ways can Tom fill his bucket?

Week 2:

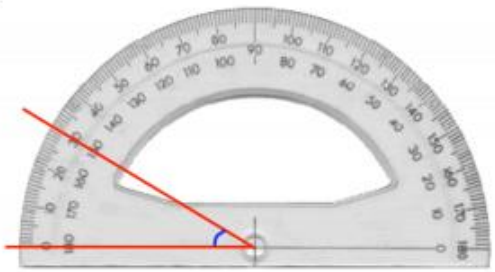
- **LI: I can draw and measure acute and obtuse angles reliably to the nearest degree**

Demonstration Videos: https://corbettmaths.com/2013/03/05/measuring-angles/

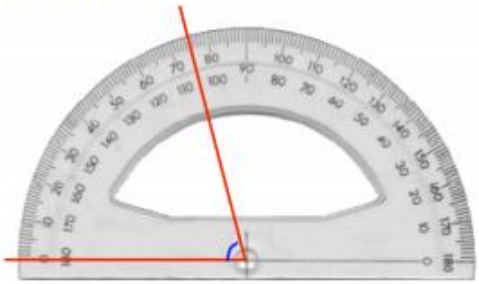
Tasks:

Question 1: Write down the size of each angle being measured

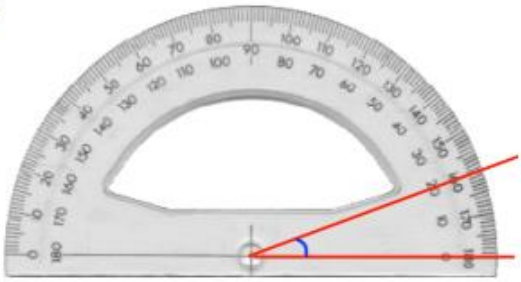
(a)



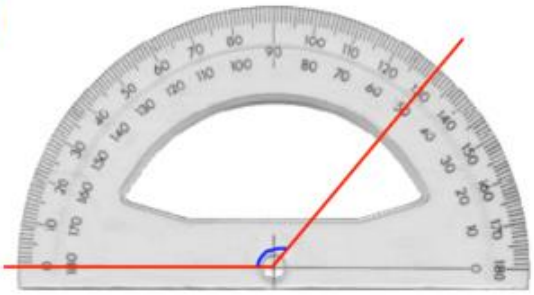
(b)



(c)



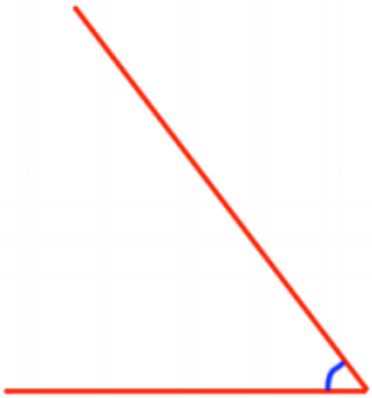
(d)



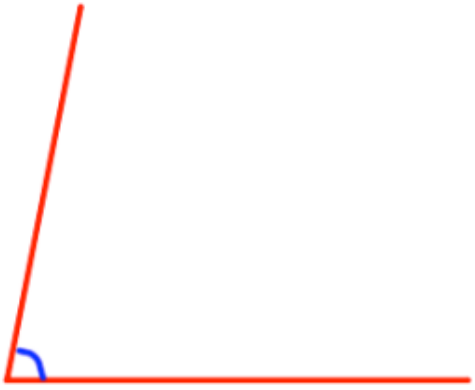
Question 2: Measure each angle below

(a)

(b)



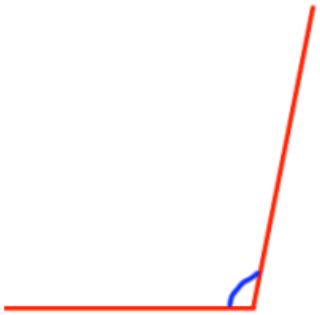
(c)



(d)

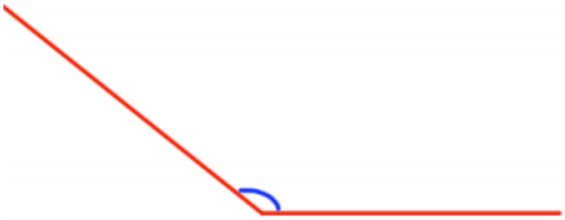
Question 3: Measure each angle below

(a)

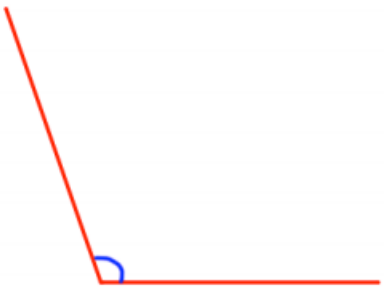


(b)

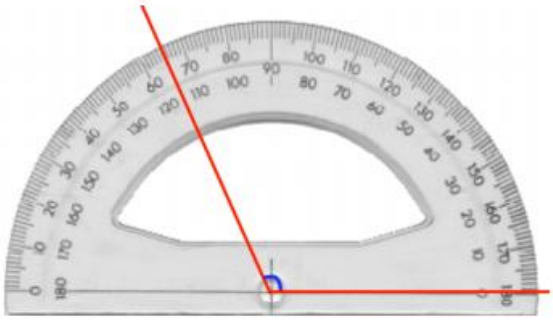
(c)



(d)



Sophie has been asked to measure this angle. Her answer is 65°
She has made a mistake. Explain what she has done wrong.



Question 1: Draw angles of the following size

(a) 20°	(b) 60°	(c) 80°	(d) 40°
(e) 10°	(f) 70°	(g) 50°	(h) 45°
(i) 25°	(j) 85°	(k) 75°	(l) 15°
(m) 12°	(n) 62°	(o) 38°	(p) 71°
(q) 56°	(r) 23°	(s) 28°	(t) 19°

Question 2: Draw angles of the following size

(a) 100°	(b) 150°	(c) 160°	(d) 120°
(e) 170°	(f) 130°	(g) 110°	(h) 125°
(i) 145°	(j) 165°	(k) 105°	(l) 95°
(m) 153°	(n) 107°	(o) 98°	(p) 133°
(q) 121°	(r) 149°	(s) 167°	(t) 108°

Space for drawing angles:

Week 2:

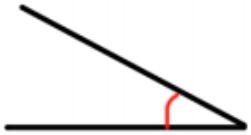
- **LI: I can estimate the size of any given angle and recognise acute, right, obtuse and reflex angles**

Demonstration Video: https://corbettmaths.com/2012/08/10/types-of-angle/

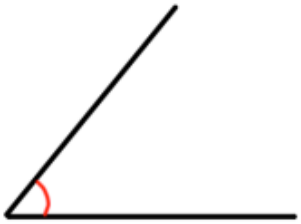
Tasks:

Question 1: Estimate the size of each of these angles

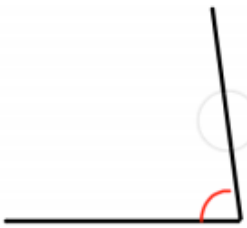
(a)



(b)



(c)



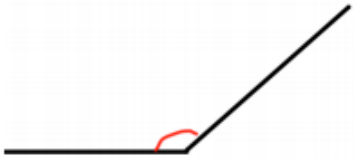
(d)

(e)

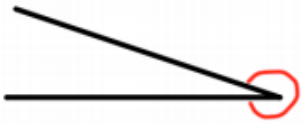
(f)

(g)

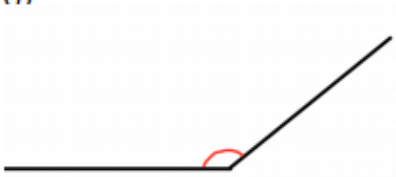
(h)



(i)



(j)



(k)

(l)

Question 2

For all the angles in question 1 above, label the *types* of angles, use

A for acute

O for obtuse

R for reflex

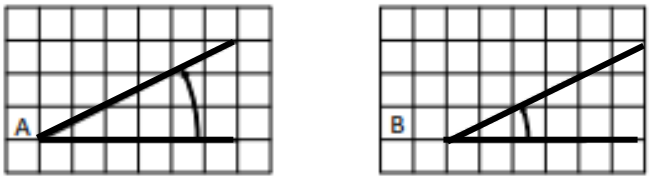
Question 3

Draw a right angle. How many degrees are in the right angle? …….

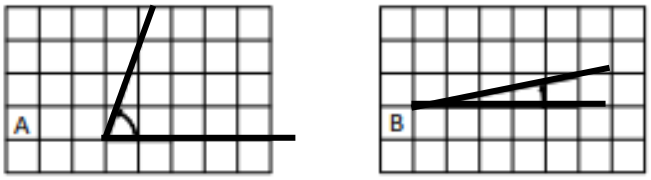
Label the right angle with the correct notation.

Decide which of the angles is larger, if any, in each case:

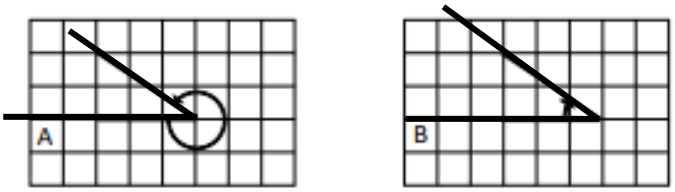
a)



b)



c)



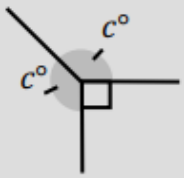
Week 3:

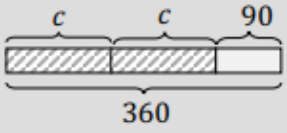
- **LI: I understand angles around a point total 360 degrees**

Demonstration Video: https://www.youtube.com/watch?v=mdAwUsf0k1s&feature=youtu.be

Tasks:

Concept Corner





135	equation
2c	solve
90	angle
270	facts

We can use _____ _____ to form an _____. We can then _____ this equation by using useful related equations.

For example: in the image above we can see that 360=___+___
Therefore ___ =____ and therefore c = ___

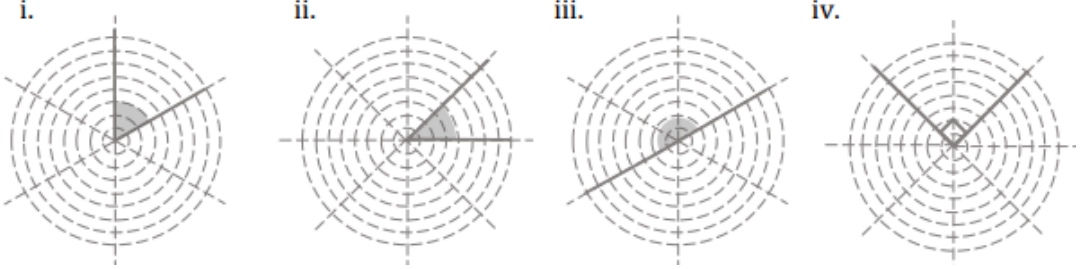
1 Calculate the following:

a) 360 ÷ 2 b) 360 ÷ 4 c) $\frac{1}{6}$ of 360 d) $\frac{1}{8}$ of 360

e) 180 ÷ 2 f) 180 ÷ 3 g) $\frac{1}{4}$ of 180 h) 90 ÷ 2

2 Which of the calculations above could help you to calculate the size of each of the angles below?

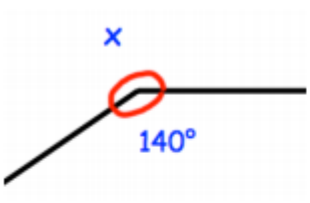
i. ii. iii. iv.



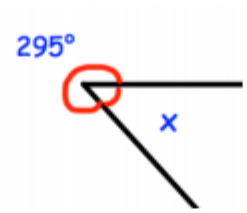
The questions on this page must be done without using a protractor

Question 3: Calculate the size of the missing angles

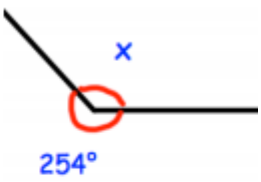
(a)



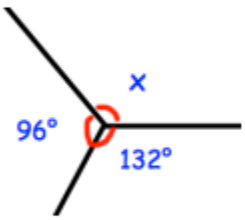
(b)



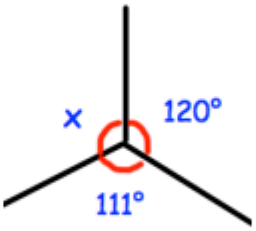
(c)



(d)

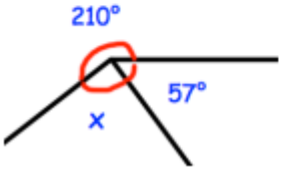


(e)

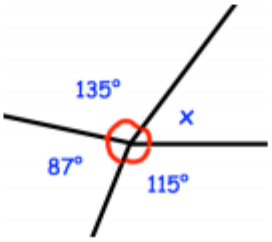


(f)

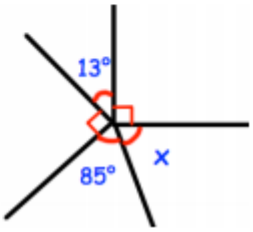
(g)

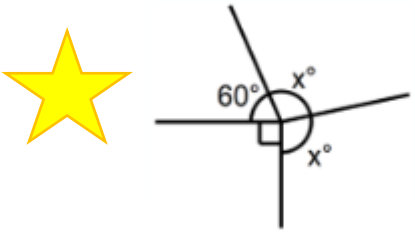


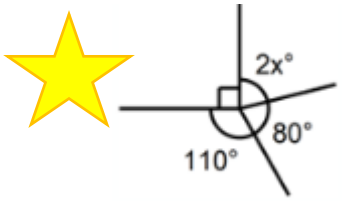
(h)



(i)



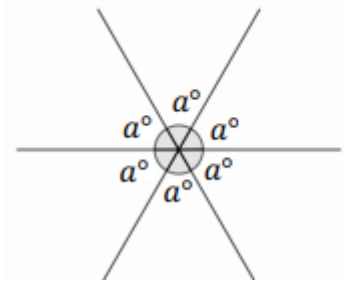




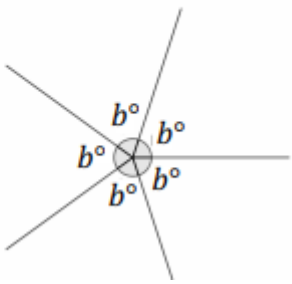
4

The diagrams below each show sets of equal angles formed around a point. Work out the size of the angles

a)



b)



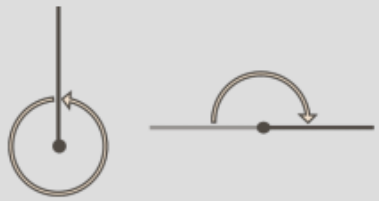
Week 3:

- **LI: I understand angles on a straight line total 180 degrees**

Demonstration Videos: https://youtu.be/q5tV5V56Hr0

Tasks:

Concept Corner



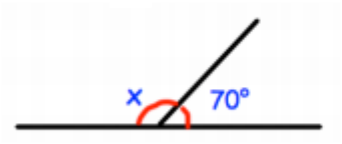
90°	turn
180°	degrees
360°	third

One way we can interpret an angle is as a measure of _____. Angles can be measured in _____. There are:

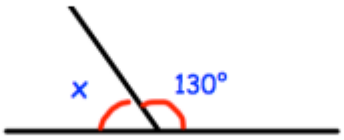
- ____ in a full turn
- ____ in a half turn
- ____ in a quarter turn
- 120° in a _____ of a turn

Question 1 Calculate the size of the missing angles

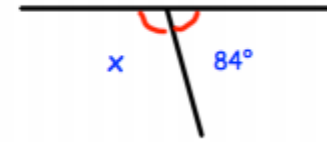
(a)



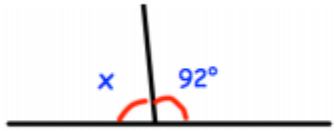
(b)



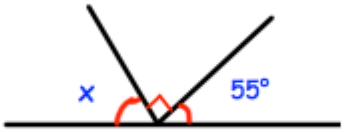
(c)



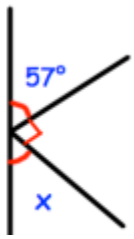
(d)



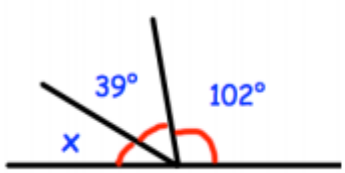
(e)



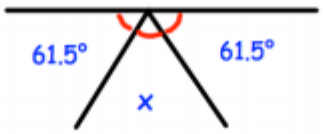
(f)



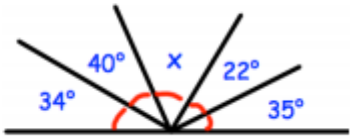
(g)



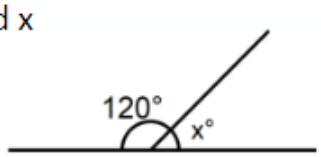
(h)

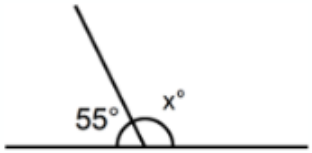


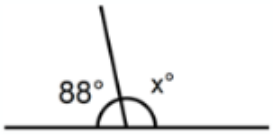
(i)

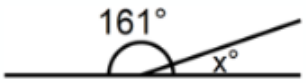


2 Find x

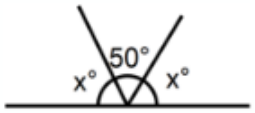
1) 

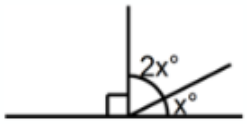
2) 

3) 

4) 

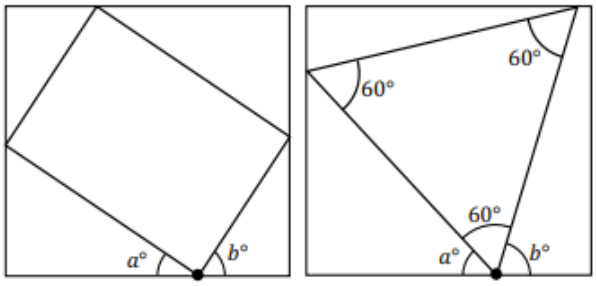
3 Find x

1) 

2) 

4 A tilted equilateral triangle and rectangle are drawn below. For each of the images find the value of: $a + b$

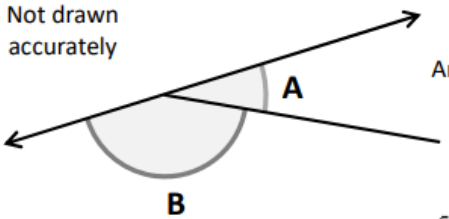
a) b)



DIGIT Puzzle

How many ways can you complete these two angles?

Not drawn accurately



Angle **A** = ☐☐☐°

Angle **B** = ☐☐☐°

★ Use any digits

★★ Use digits only once

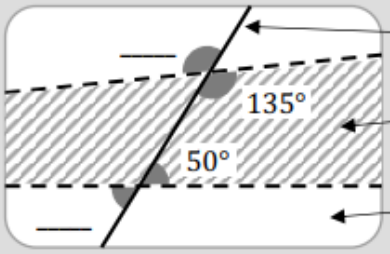
What are the largest & smallest angles you can make?

Week 3:

- **LI: I understand that vertically opposite angles are equal**

Demonstration Videos: https://corbettmaths.com/2013/03/16/vertically-opposite-angles/
Tasks:

Concept Corner



_____

_____ region

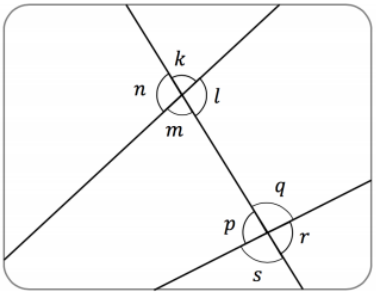
_____ region

135° | vertically | interior | exterior | 50° | transversal

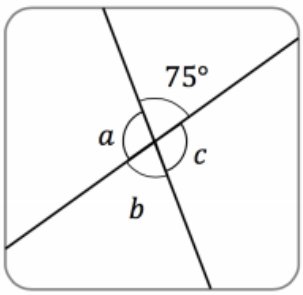
We call the space between two lines the **interior region**. The space outside the lines is called the **exterior region**. If a third line crosses these two lines we call it a **transversal**.

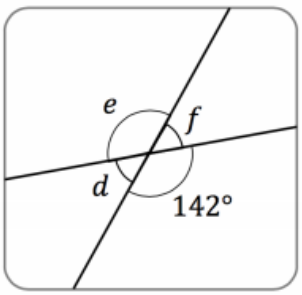
Each of the intersections formed has two pairs of _____ opposite angles which are always equal.

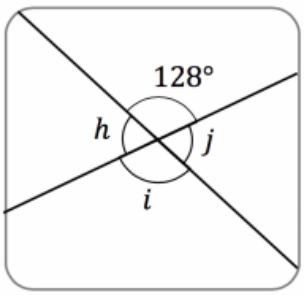
1 Identify all the pairs of **vertically opposite angles** in the diagram below.



2 The diagrams below show intersections between straight lines. Work out the missing angles.

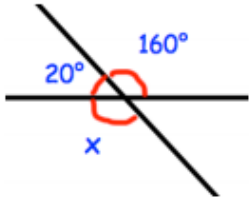




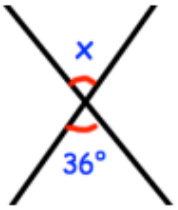


Question 3 Shown below are two straight lines that cross.
Calculate the size of the missing angles

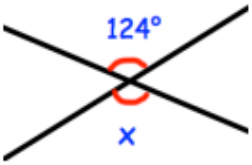
(a)



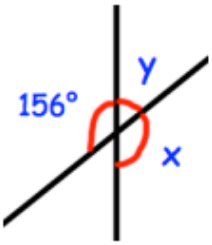
(b)



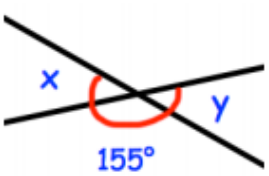
(c)



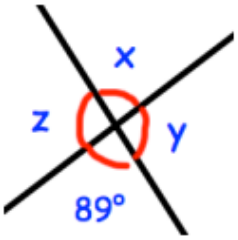
(d)



(e)



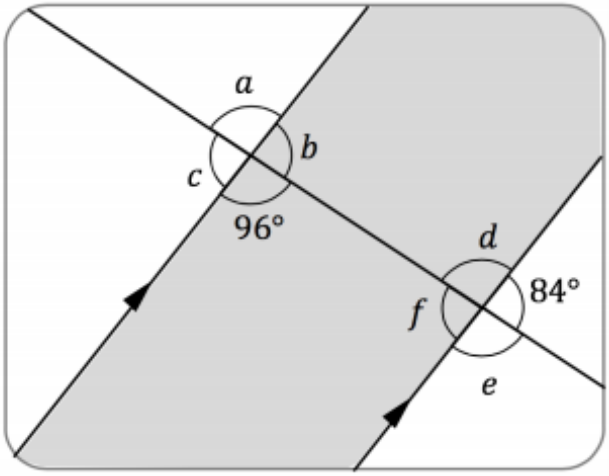
(f)

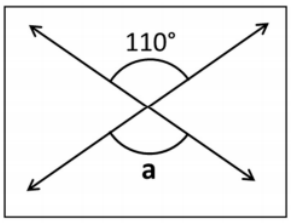


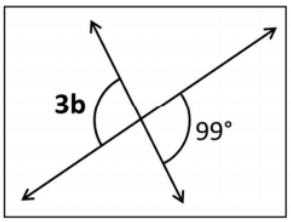
4 The diagram on the right shows a pair of parallel lines crossed by a transversal.

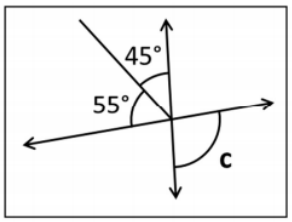
a) Work out the missing angles.

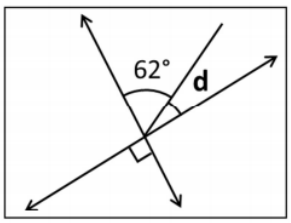
b) Write a sentence to compare the angles formed at each intersection.

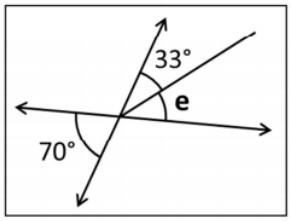


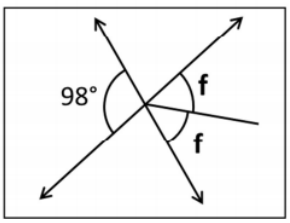


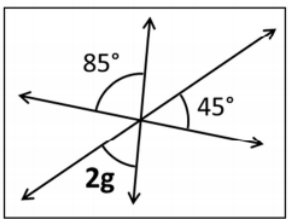


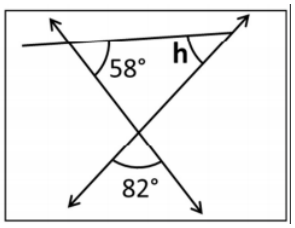












Week 4:

- **LI: I can classify triangles according to their properties**

Demonstration Video: https://corbettmaths.com/2012/08/09/types-of-triangles/

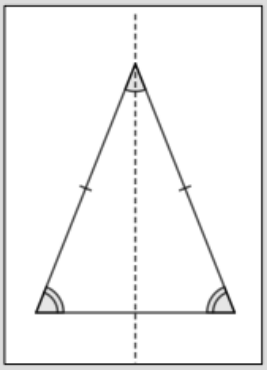
Tasks:

Concept Corner

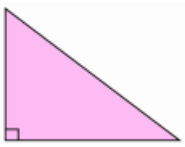
Triangles can be categorised by analysing their geometric properties.

e.g. ..... triangles have ..... equal sides, ... equal angles, one line of symmetry and ..... symmetry order one.

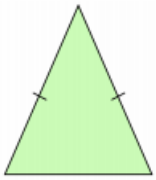
two | Isosceles | two | rotational

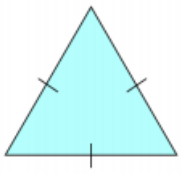


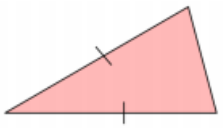
Question 1: Write down what type of triangle each picture shows.

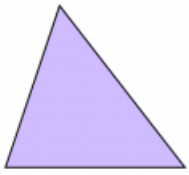
(a) 

(b) 

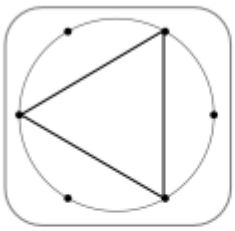
(c) 

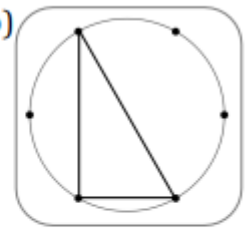
(d) 

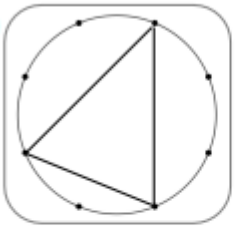
(e) 

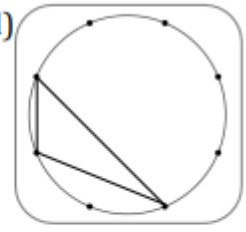
(f) 

1. State with a reason if the following triangles are equilateral, isosceles or scalene

a) 

b) 

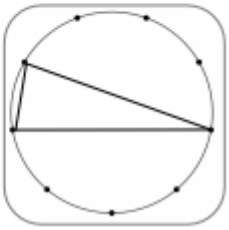
c) 

d) 

e) 

f) 

g) 

h) 

1 Copy and complete the table of types of triangles below. Where the triangle is possible, draw an example, otherwise write 'impossible'. Remember to label angles and sides that are equal.

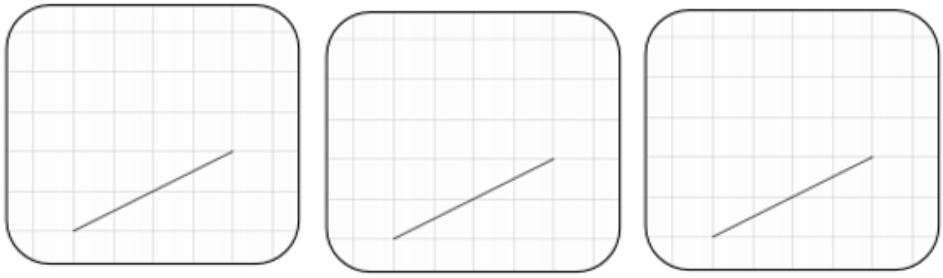
	Scalene	Isosceles	Equilateral
No right angles			
Exactly one right angle			
No obtuse angles			
Exactly one obtuse angle			
More than one obtuse angle			

2 Decide if the following statements are always, sometimes or never true. Sketch a triangle to justify your responses.

a) Equilateral triangles have three lines of symmetry
b) An isosceles triangle has order of rotational symmetry order two
c) A triangle has the same number of line symmetries as its order of rotational symmetry
d) A scalene triangle has no symmetries.
e) The equal sides on an isosceles triangle are longer than the third side.
f) Right-angle triangles are also scalene.

3 Copy the line segment shown in the diagram.

a) an isosceles triangle
b) a scalene triangle
c) a right-angle triangle



Stewards Academy

Week 4:

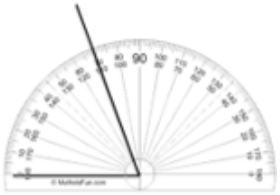
- **LI: I can use a ruler and protractor to construct triangles**

Demonstration Videos: https://corbettmaths.com/2013/03/28/constructing-sas-triangles/
https://corbettmaths.com/2013/03/29/constructing-asa-triangles/

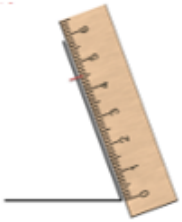
Tasks:

Side Angle Side triangles (there is an angle between two sides)

1. Using a ruler, draw out a line that is the length of one of the sides
2. Measure the given angle from the end of the line you have just drawn and draw a long line to mark your angle



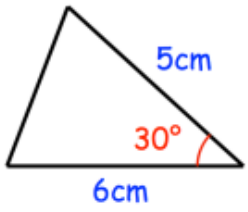
3. Using a ruler, measure along the line for the given length



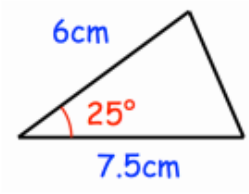
4. Connect the other end of the first line to finish off your triangle. Then **label all of the sides and angles** you have just measured/drawn.

Question 1: Accurately draw the following triangles.

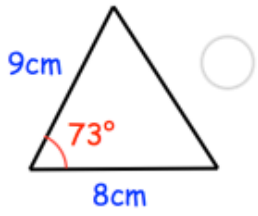
(a)



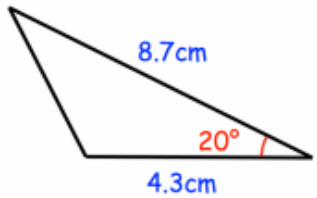
(b)



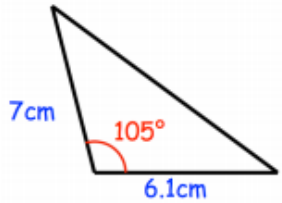
(c)



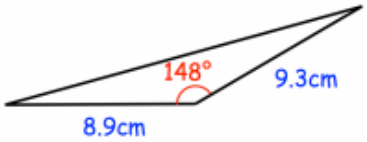
(d)



(e)

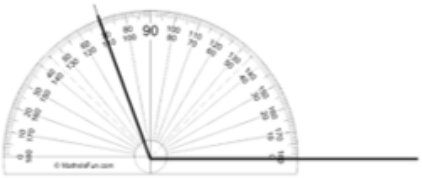


(f)

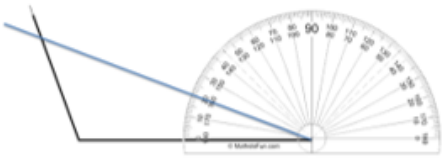


Angle Side Angle Triangles (two angles with a side between them)

1. Draw a line with the given length
2. Measure one of the angles from one end of the line. The line going through the angle should be quite long

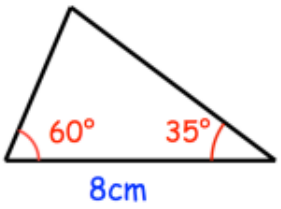


3. Measure the other angle from the other end of the line. The line through that angle will meet the line through the other angle. Then **label all of the sides and angles** you have just measured/drawn.

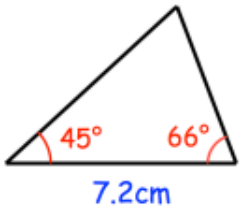


Question 2: Accurately draw the following triangles.

(a)



(b)



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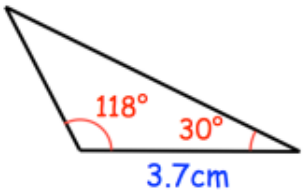
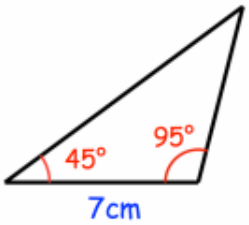


(d)

(e)



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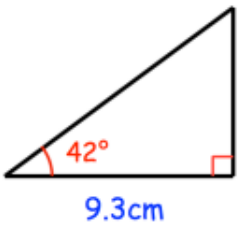


Question 1: Accurately draw two different isosceles triangles with an angle of 50°

Question 2: (a) Construct an equilateral triangle with side length of 6cm

(b) Measure the height of the triangle

(c) Work out the area of the triangle

Page for drawing triangles

Stewards Academy

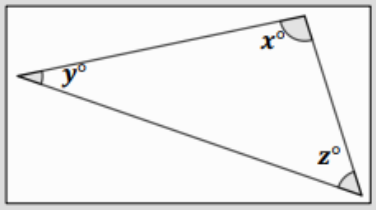
Week 4:

- **LI: I understand that the sum of interior angles of a triangle is 180 degrees**

Demonstration Videos: https://corbettmaths.com/2012/08/10/angles-in-a-triangle/

Tasks:

Concept Corner



81 | interior | 180° | sum

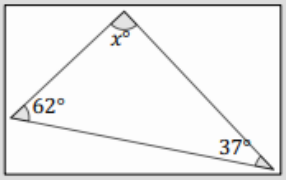
The ..... of the ..... angles in any triangle is equal to 180 degrees

So, in the triangle above, $x° + y° + z° =$ .....

We can use this fact to find missing angles in triangles.

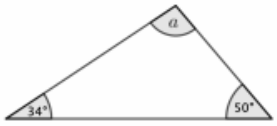
e.g. In the triangle to the right

$x + 62 + 37 = 180$ therefore $x =$ .....



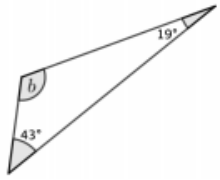
1. i) Draw a bar model for each of the six problems below.
   ii) Find the missing angle using your model.

a)

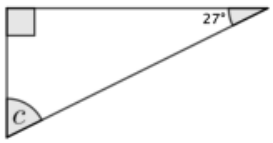


a	50	34
180		

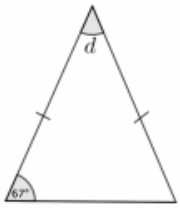
b)



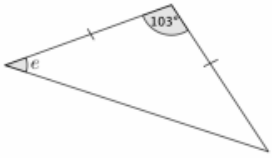
c)



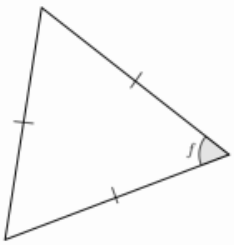
d)



e)

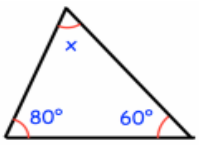


f)

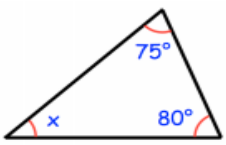


Question 2 Find the size of each missing angle.

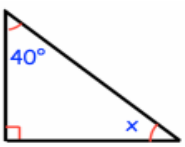
(a)



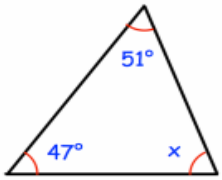
(b)



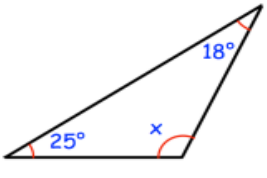
(c)



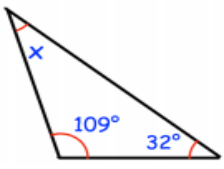
(d)



(e)

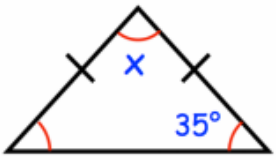


(f)

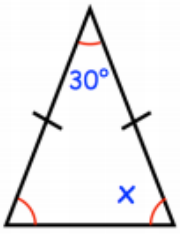


Question 2: Find the size of each missing angle.

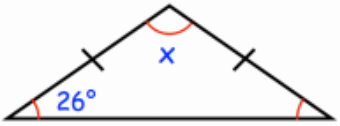
(a)



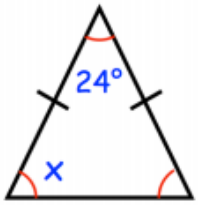
(b)



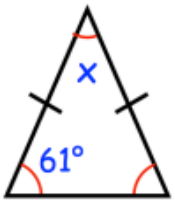
(c)



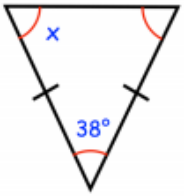
(d)



(e)



(f)



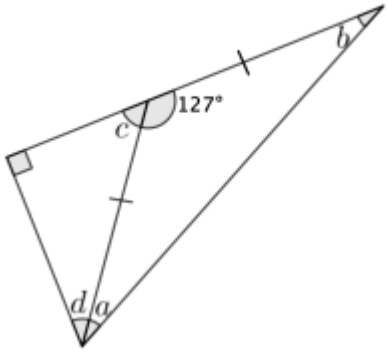
3 Jacob has measured the three angles in a triangle.
Two of his measurements are 45°and 70°
What is the third measurement?

4 An isosceles triangle has one angle of 52°.
Write down the possible sizes of the other two angles in the triangle.

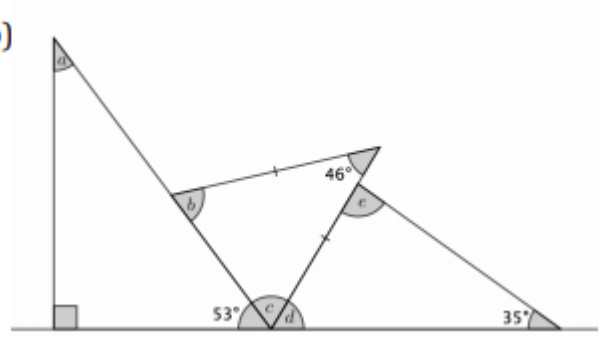
Pair 1 ..... and .....
Pair 2 ..... and .....

5 Find the missing angles in the following problems

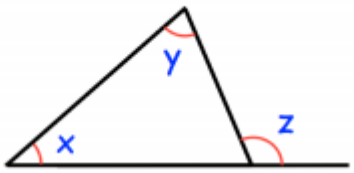
a)



b)



Show the sum of angles x and y is always equal to angle z



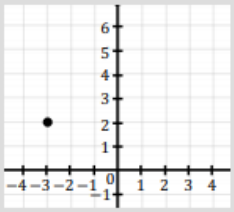
Week 5:

- **LI: I can solve problems involving coordinates in the first quadrant**

Demonstration Video: https://corbettmaths.com/2013/04/15/coordinates/
Note: this video gives information about 4 quadrants, you will only be asked questions here about the first quadrant (where all the coordinates are positive)

Tasks:

Concept Corner

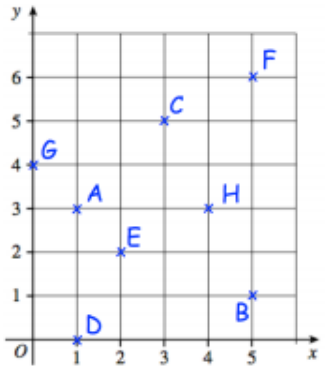


(−3,2) | x −ordinate
(0,0) | y −ordinate
vertical | horizontal

We can use a coordinate: (x, y) to describe a location in 2-D space. A coordinate consists of two values, an x-ordinate and a y-ordinate. The _____ describes the horizontal location and the _____ describes the vertical location. The origin is the point _____.

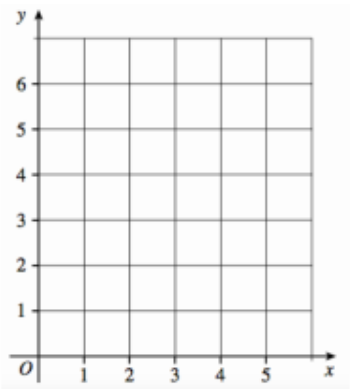
e.g. The point _____ is a point 3 spaces to the left and 2 spaces up from the origin.

Question 1: Write down the coordinates of the points A, B, C, D, E, F, G and H.

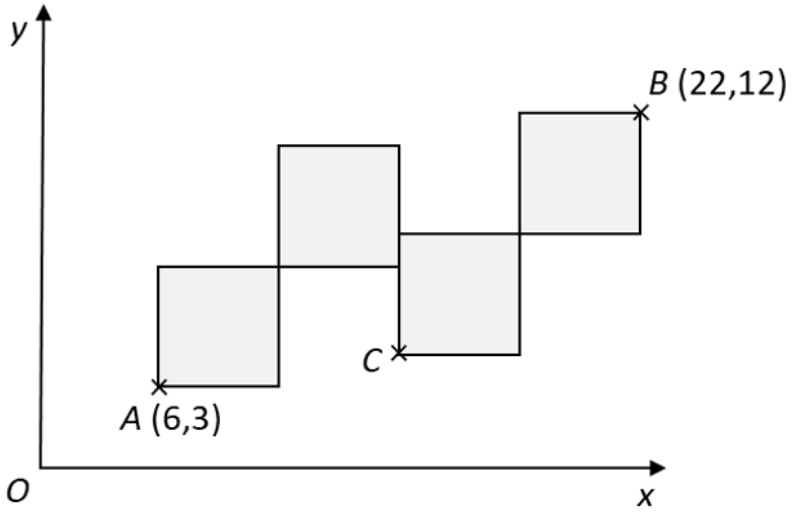


Question 2: Plot the points on this grid

(a) A (3, 1)
(b) B (2, 5)
(c) C (5, 4)
(d) D (1, 1)
(e) E (4, 0)
(f) F (0, 1)
(g) G (3, 3)
(h) H (0, 0)

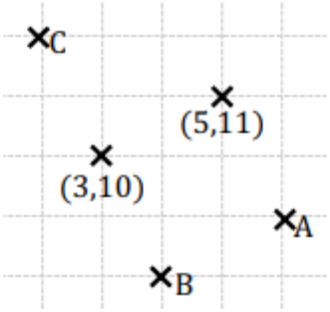


1)



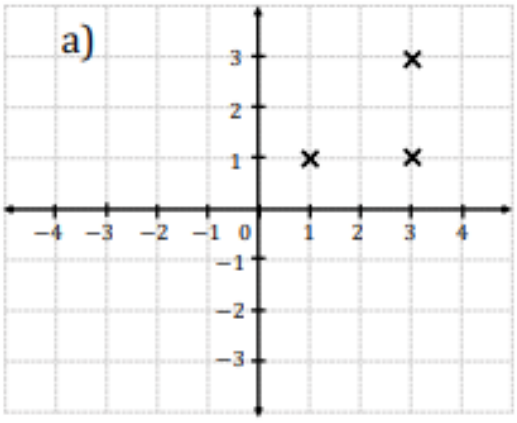
These are identical squares. What is coordinate C? (_____ , _____)

3. The image below is a taken from a section of a coordinate grid. Find the coordinates of the points A, B and C:



4. Find the fourth coordinate point to make:

a) A square
b) A trapezium
c) A parallelogram
d) A kite



Week 5:

- **LI: I can identify lines of symmetry in any shape**

Demonstration Video: https://corbettmaths.com/2013/05/15/line-symmetry/

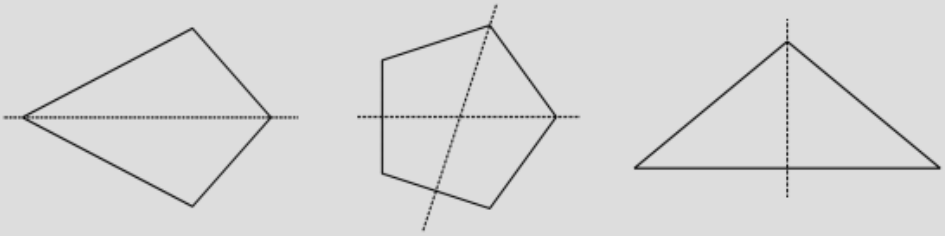
Tasks:

Concept Corner

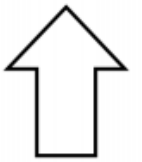
A ..... shape has line ..... or reflective symmetry if it can be divided into two identical ..... by drawing a straight line.

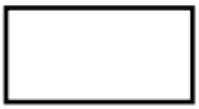
2-D | symmetry | halves

The diagrams below show shapes with some of their lines of symmetry marked on.



Question 1: Draw all the lines of symmetry on each the shapes below

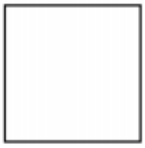
(a) 

(b) 

(c) 

(d) 

(e) 

(f) 

For each road sign, write down the number of lines of symmetry.

(a) 

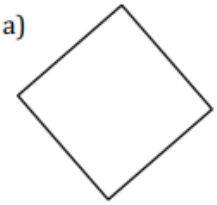
(b) 

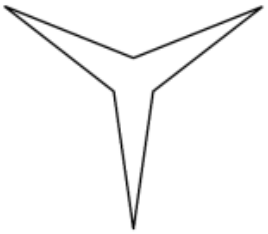
(c) 

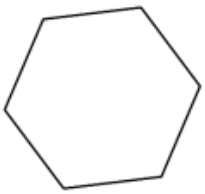
(d) 

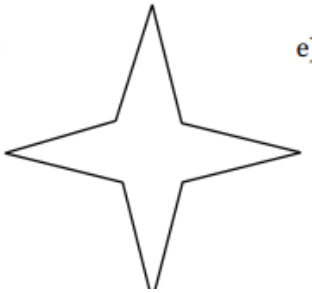
(e) 

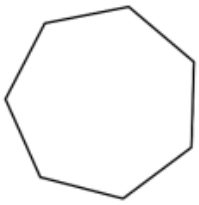
1. All the polygons below have equal sides (they are equilateral).
   How many lines of symmetry does each shape have?

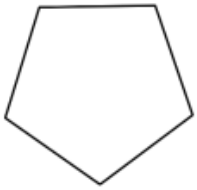
a) 

b) 

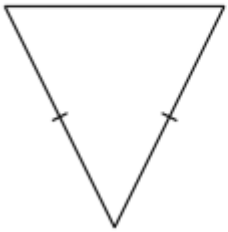
c) 

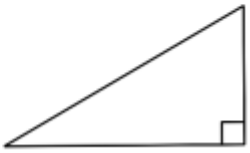
d) 

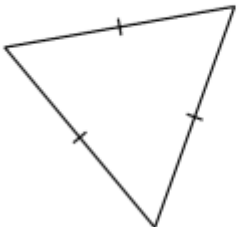
e) 

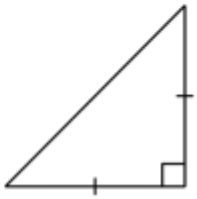
f) 

2. Write down the mathematical name for each of these triangles.
   Copy each triangle and draw in their lines of symmetry.

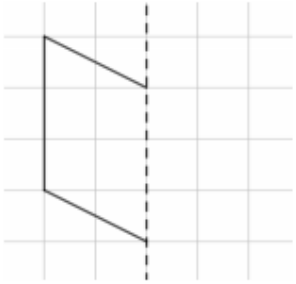


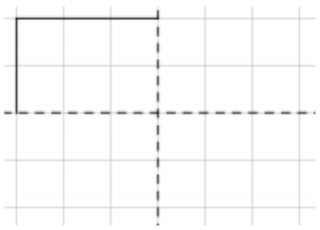


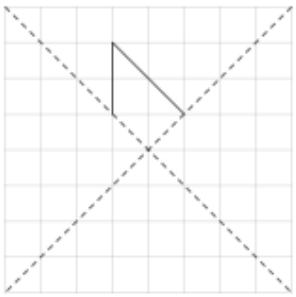




3. Each dotted line shows a line of symmetry of an incomplete polygon.
   Make a copy of the full polygons marking the lines of symmetry.

a) 

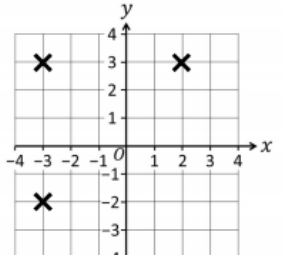
b) 

c) 

Challenge questions

1) Complete the square.

Point Coordinates: _____

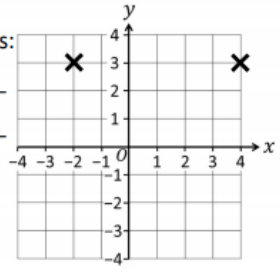


2) Complete a square that has the x-axis as a line of symmetry.

Coordinates:

_____

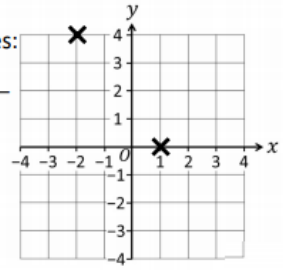
_____



3) Complete an isosceles triangle that has the x-axis as a line of symmetry.

Coordinates:

_____



Week 5:

- **LI: I can identify the order of rotational symmetry in any shape**

Demonstration Video: https://corbettmaths.com/2012/08/10/rotational-symmetry/

Tasks:

Concept Corner

The order of _____ symmetry is the number of positions a shape can be rotated into and still look the same.

The number of times the shape appears the same is called its _____ of rotational symmetry.

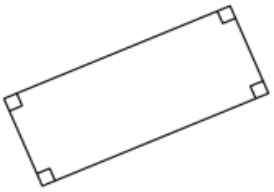
2	order
4	rotational

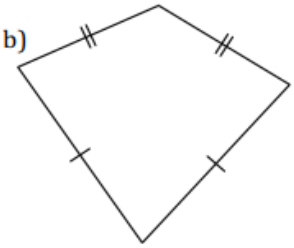
All shapes have rotational symmetry of order at least one.

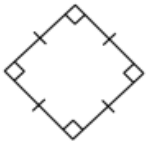
A square has rotational symmetry of order .....

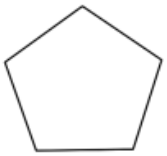
A rectangle has rotational symmetry of order .....

1. Write down the order of rotational symmetry of each of the following shapes.

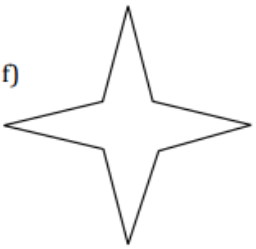
a) 

b) 

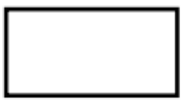
c) 

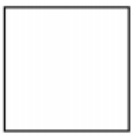
d) 

e) 

f) 

Question 1: For each shape below, state the order of rotational symmetry

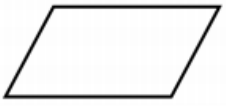
(a) 

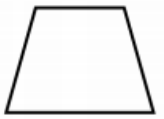
(b) 

(c) 

(d) 

(e) 

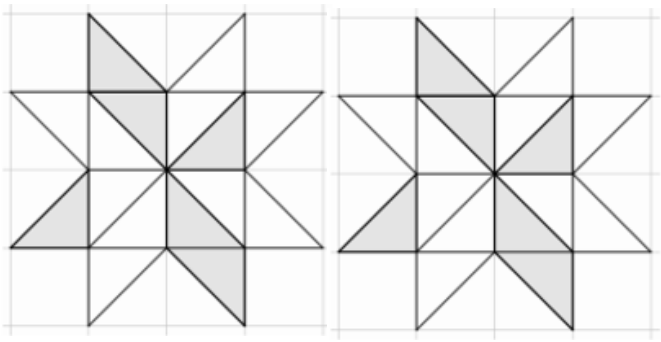
(f) 

(g) 

(h) 

(i) 

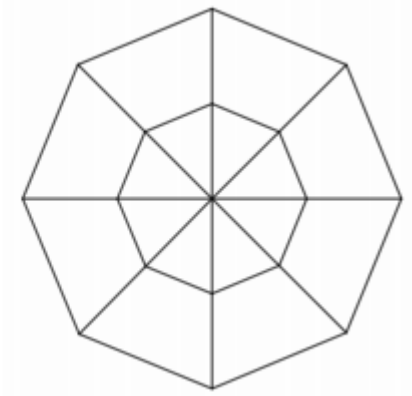
2. Use the two copies of the shape to the right to:



a) Shade two more regions such that the shape has rotational symmetry order 4

b) Shade four more regions such that the shape has rotational symmetry order 2

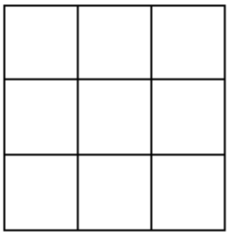
3. The octagon below has been divided into 16 regions. If you were to shade in the regions:



a) What is the range of possible orders of rotational symmetry?
b) Which orders of rotational symmetry are not possible from shading the regions? Explain why.

Questions for depth:

Consider a 3 x 3 square grid.



a) How many ways can you shade complete squares to create a shape that has rotational symmetry order 2?

b) What is the maximum number of squares you can shade so that the shape created has rotational symmetry order 2? What is the minimum?

c) Answer parts a) and b) for a 4 x 4 square grid.

Week 6:

- **LI: I can create shapes given details of their symmetries**

Demonstration Videos: https://corbettmaths.com/2013/05/15/line-symmetry/
https://corbettmaths.com/2012/08/10/rotational-symmetry/

Note, these are the videos from the last two lessons. Watch them again to help you do the tasks today. You might also find looking over your previous answers helpful.

Tasks:

1 Draw a shape with:
(a) 1 line of symmetry
(b) 2 lines of symmetry
(c) 0 lines of symmetry

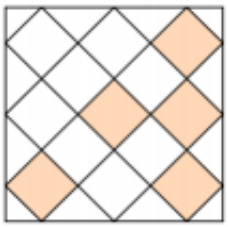
2 Draw a polygon that satisfies the conditions of each region in the following table.
If a region cannot be filled, explain why.

		Number of lines of symmetry			
		1	2	3	4
Number of sides	3				
	4				
	5				
	6				

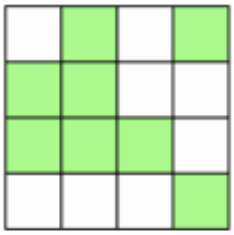
3 Draw a polygon that satisfies the conditions of each box in the following table.
If a box cannot be filled, explain why.

		Order of rotational symmetry			
		1	2	3	4
Number of sides	3				
	4				
	5				
	6				

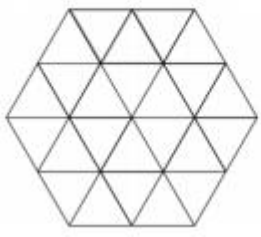
4 Shade one more square so this pattern has one line of symmetry



Shade three more squares so this pattern has one line of symmetry



Shade six triangles to make a pattern with rotational symmetry order 6.



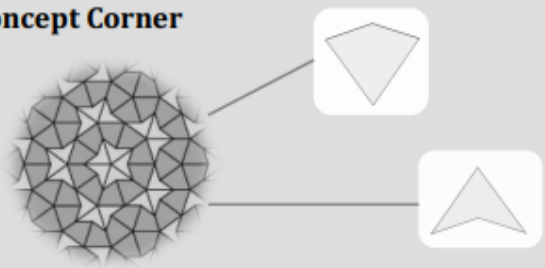
Week 6:

- **LI: I can investigate and create tessellations**

Demonstration Videos: https://corbettmaths.com/2012/08/02/tessellations-video/

Tasks:

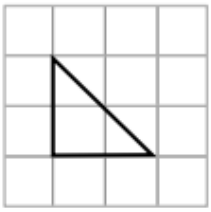
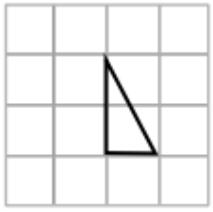
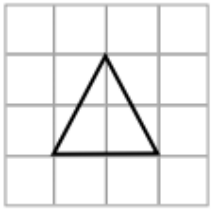
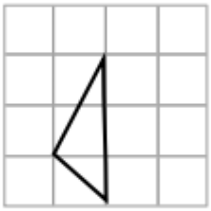
Concept Corner



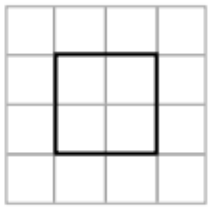
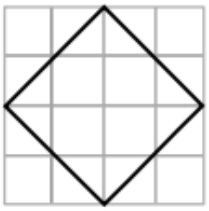
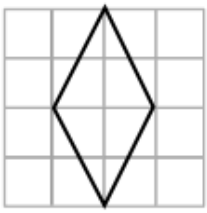
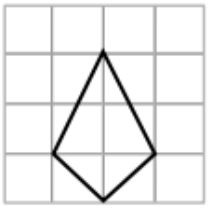
kite | tessellation | delta | tiles | gaps | overlaps

A _____ is the tiling of a region using one or more shapes called _____, with no _____ and no _____. In this example the tiles used are a _____ and a _____.

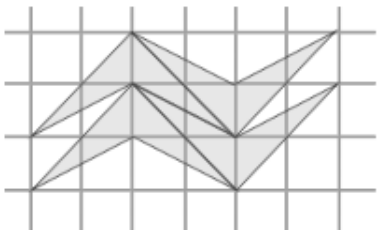
1. Create a tessellation pattern using eight copies of each of the following triangles:

a)  b)  c)  d) 

2. Create a tessellation pattern using eight copies of each of the following quadrilaterals:

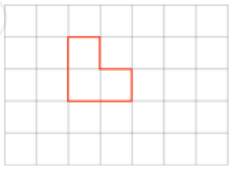
a)  b)  c)  d) 

3. Copy and complete the tessellation pattern using an additional eight deltas:



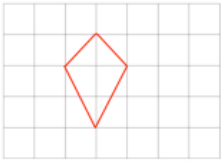
Question 4 Show how each of the following shapes tessellate.
For each you should draw at least 8 shapes.

(a)

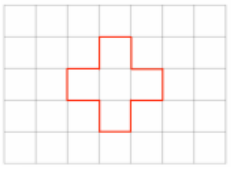


(b)

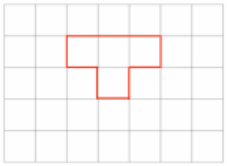
(c)



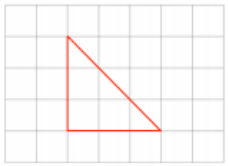
(d)



(e)

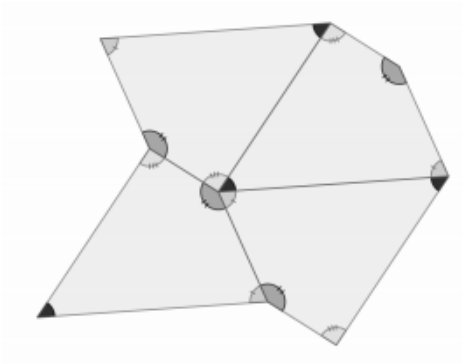


(f)



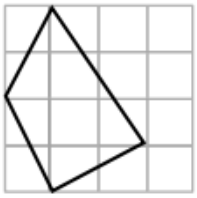
5 This student is trying to tesselate quadrilateral tiles.

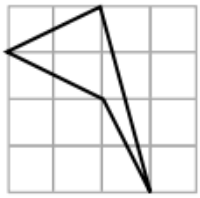
Place four tiles around a point by letting the four interior angles meet there.



a) Explain why the four interior angles of any quadrilateral will be able to meet at a point.

b) Draw a similar pattern for each of the following using four tiles.



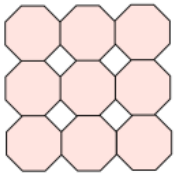


There are three regular tessellations that are possible using only one type of regular polygon (equilateral triangles, squares and hexagons)

There are several more semi-regular tessellations which are made from two or more types of regular polygon.

The pattern below shows a semi-regular tessellation using squares and regular octagons.

What other semi-regular tessellations can you find?



Attainment Band :	Unit 3 - Construction and loci, Angles in parallel lines and Angles in polygons	
	Knowledge and Understanding	**Skills**
Yellow Plus	Understands how to convert measurements when squared 6*	Converts cm^2 to m^2 when solving problems 6 Finds the area of compound shapes involving triangles, trapeziums and parallelograms 11 Sets up and solves an equation involving angles in parallel lines 10
Yellow	Understands how to solve problems involving angles in parallel lines 4 Understands how to construct triangles 2 Derives and uses the standard ruler and compass constructions 3	Identifies the different types of angles formed by parallel lines and a transversal such as corresponding angles, alternate angles and interior angles 4 Uses the various properties of angles in parallel lines to solve problems 5
Blue	Recognises how to find the area of various shapes 11 Understands that angles in a triangle add up to 180 degrees 1	Constructs a triangle given three sides using a compass 2 Finds missing angles in geometrical figures 3a Draws a rhombus given two sides and one angle 3b Solves problems with angles in triangles 5 Finds area of a trapezium 7 Solves real life problems involving area with conversions 8 Finds the area of a parallelogram 11
Green	Derives and illustrates properties of quadrilaterals 3 Understands how to convert standard units of measure 8	Draws a square given one side 9a Draws a quadrilateral with the parallel sides indicated 9b
White	Understands angle properties in a triangle 1	Identify mistakes in measuring angles 1