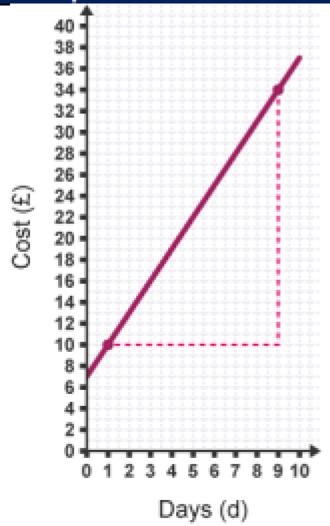
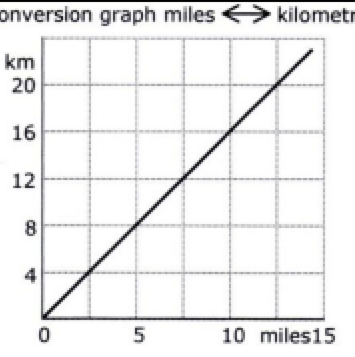
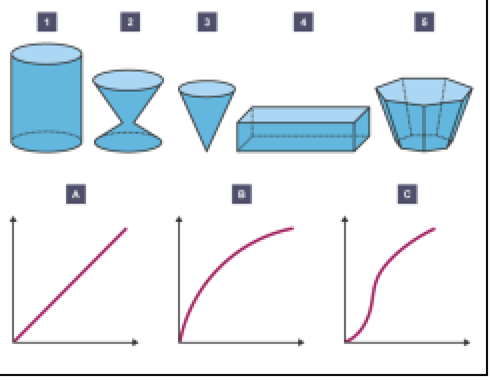
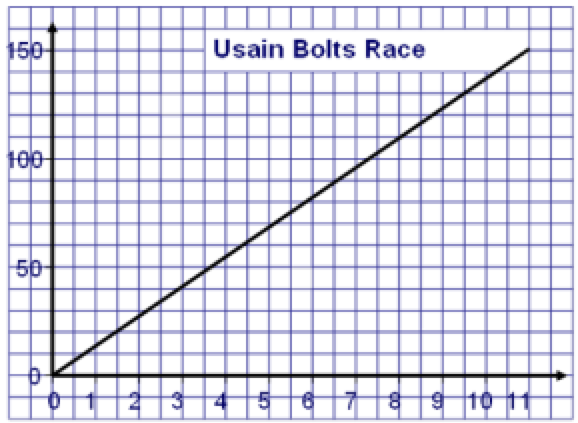
Topic/Skill	Definition/Tips	Example
1. Real Life Graphs	Graphs that are supposed to model some real-life situation. The actual meaning of the values depends on the labels and units on each axis. The **gradient** might have a contextual meaning. The **y-intercept** might have a contextual meaning. The **area** under the graph might have a contextual meaning.	 A graph showing the cost of hiring a ladder for various numbers of days. The gradient shows the cost per day. It costs £3/day to hire the ladder. The y-intercept shows the additional cost/deposit/fixed charge (something not linked to how long the ladder is hired for). The additional cost is £7.
2. Conversion Graph	A line graph to **convert one unit to another**. Can be used to convert units (e.g. miles and kilometres) or currencies ($ and £) Find the value you know on one axis, read up/across to the conversion line and read the equivalent value from the other axis.	Conversion graph miles ⟷ kilometres  $8\ km = 5\ miles$
3. Depth of Water in Containers	Graphs can be used to show how the depth of water changes as different shaped containers are filled with water at a constant rate.	

Try These

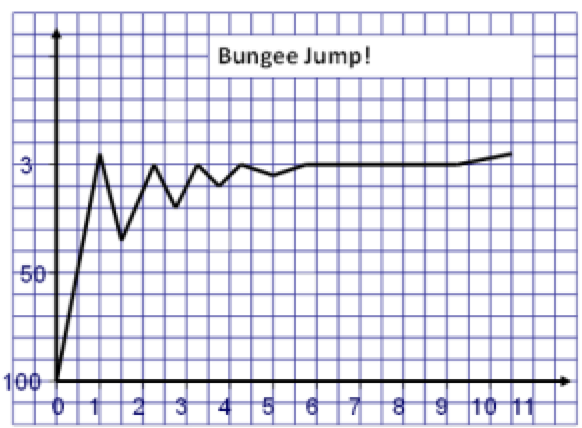
Distance (metres)



Time

a. How far has he run after 4.5 seconds?
b. How long has it taken Usain to run 130 metres?
c. How far has he run after 8 seconds?
d. Why does the line go through the origin?

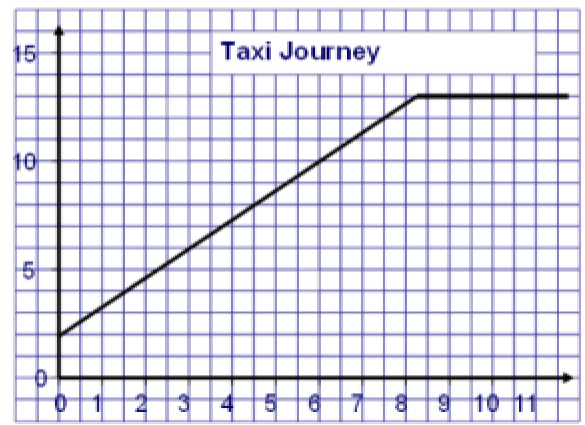
Distance to from the floor in metres (h)



Time in seconds (t)

a. How high is the bungee jump?
b. Why does the graph zig zag?
c. How long is the person falling for until they begin to bounce back up?
d. Why does the person stop at 3 metres and not 0?
e. How long is the person not bouncing but still upside down for?

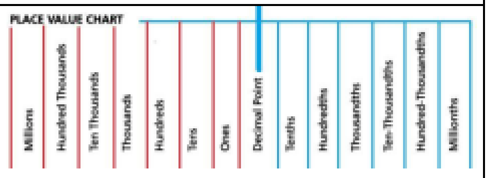
Taxi Fare in £ (f)

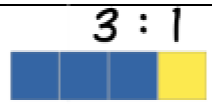


Distance in miles (d)

a. Why does the taxi fare not go through the origin?
b. How much does it cost to travel 6 miles?
c. How far can I travel if I only have £10 in my pocket?
d. What does the journey cost after 9 miles? And 11 miles?
e. What does the flat part of the graph mean?
f. What is the equation of the line from 0 to 8 minutes?
g. What is the equation of the line from 8 minutes onwards?

Exmouth Community College
Academy Trust

Topic/Skill	Definition/Tips	Example
1. Place Value	The **value** of where a **digit** is within a number.	In 726, the value of the 2 is 20, as it is in the 'tens' column.
2. Place Value Columns	The names of the columns that **determine the value of each digit**. The 'ones' column is also known as the 'units' column.	
3. Rounding	To make a number simpler but keep its value close to what it was. If the **digit to the right** of the rounding digit is **less than 5, round down**. If the **digit to the right** of the rounding digit is **5 or more, round up**.	74 rounded to the nearest ten is 70, because 74 is closer to 70 than 80. 152,879 rounded to the nearest thousand is 153,000.
4. Decimal Place	The **position** of a digit to the **right of a decimal point**.	In the number 0.372, the 7 is in the second decimal place. 0.372 rounded to two decimal places is 0.37, because the 2 tells us to round down. Careful with money – do not write £27.4, instead write £27.40
5. Significant Figure	The significant figures of a number are the digits which **carry meaning** (ie. are significant) to the size of the number. The **first significant figure** of a number **cannot be zero**. In a number with a decimal, trailing zeros are not significant.	In the number 0.00821, the first significant figure is the 8. In the number 2.740, the 0 is not a significant figure. 0.00821 rounded to 2 significant figures is 0.0082. 19357 rounded to 3 significant figures is 19400. We need to include the two zeros at the end to keep the digits in the same place value columns.
6. Truncation	A method of approximating a decimal number by **dropping all decimal places** past a certain point **without rounding**.	3.14159265... can be truncated to 3.1415 (note that if it had been rounded, it would become 3.1416)
7. Error Interval	A **range of values** that a number could have taken before being rounded or truncated. An error interval is written using inequalities, with a **lower bound** and an **upper bound**. Note that the lower bound inequality can be 'equal to', but the upper bound cannot be 'equal to'.	0.6 has been rounded to 1 decimal place. The error interval is: $0.55 \leq x < 0.65$ The lower bound is 0.55 The upper bound is 0.65
8. Integer	A **whole number** that can be positive, negative or zero.	$-3, 0, 92$

9. Decimal	A number with a **decimal point** in it. Can be positive or negative.	$3.7, 0.94, -24.07$
10. Negative Number	A number that is **less than zero**. Can be decimals.	$-8, -2.5$
11. Ratio	Ratio compares the size of **one part** to **another part**. Written using the ':' symbol.	
12. Proportion	Proportion compares the size of **one part** to the size of the **whole**. Usually written as a fraction.	In a class with 13 boys and 9 girls, the proportion of boys is $\frac{13}{22}$ and the proportion of girls is $\frac{9}{22}$
13. Simplifying Ratios	**Divide** all parts of the ratio by a **common factor**.	5 : 10 = 1 : 2 (divide both by 5) 14 : 21 = 2 : 3 (divide both by 7)
14. Ratios in the form $1 : n$ or $n : 1$	**Divide** both parts of the ratio by one of the numbers to make **one part equal 1**.	$5 : 7 = 1 : \frac{7}{5}$ in the form 1 : n $5 : 7 = \frac{5}{7} : 1$ in the form n : 1
15. Sharing in a Ratio	**1. Add** the total parts of the ratio. **2. Divide** the amount to be shared by this value to find the value of one part. **3. Multiply** this value by each part of the ratio. Use only if you **know the total**.	Share £60 in the ratio 3 : 2 : 1. 3 + 2 + 1 = 6 60 ÷ 6 = 10 3 x 10 = 30, 2 x 10 = 20, 1 x 10 = 10 £30 : £20 : £10

Try these …

7 a Work out

i 26.8 ÷ 10

ii 26.8 × 0.01

iii 26.8 × 0.1

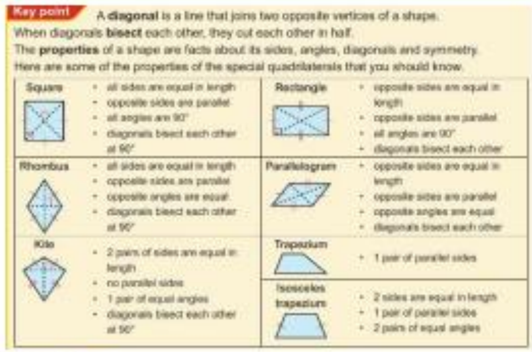
b Explain why two of the calculations give the same answer.

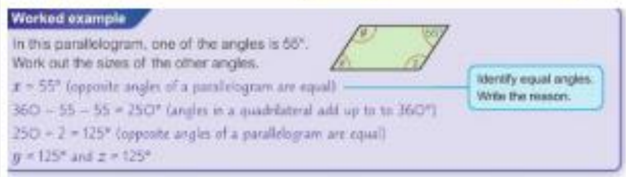
10 Simplify these ratios.

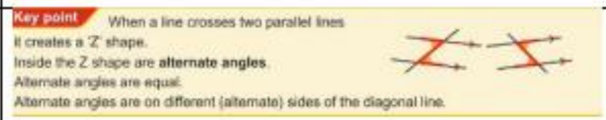
a 24 : 120

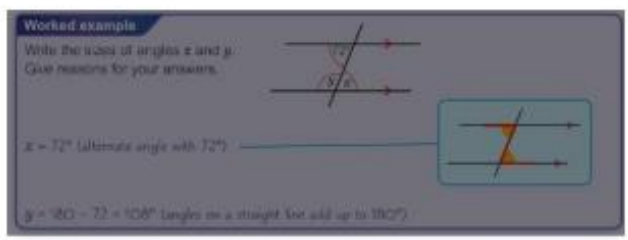
b 20 : 7.5

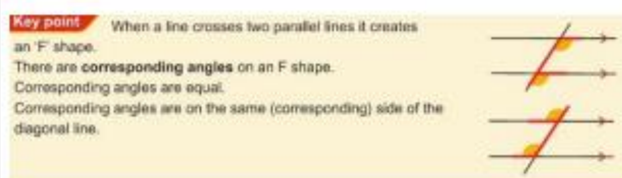
<table>
<tr><th>Topic/Skill</th><th>Definition/Tips</th><th>Example</th></tr>
<tr><td>7.1 Quadrilaterals</td><td>Classify Quadrilaterals by their geometric properties.

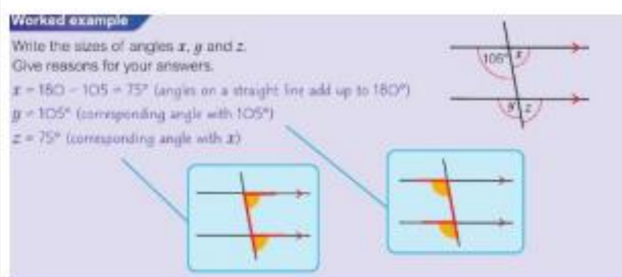
Solve problems using side and angle properties of special quadrilaterals.</td><td>


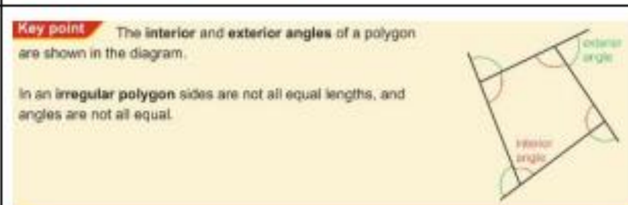


</td></tr>
<tr><td>7.2 Alternate angles and proof</td><td>Identify alternate angles on a diagram.
Understand proofs of angle facts.</td><td>




</td></tr>
<tr><td>7.3 Angles in parallel lines</td><td>Identify corresponding angles.
Solve problems using properties of angles in parallel and intersecting lines.</td><td>




</td></tr>
<tr><td>7.4 Exterior and Interior angles</td><td>Calculate the sum of the interior and exterior angles of a polygon.</td><td>


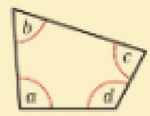
</td></tr>
</table>

	Work out the sizes of interior and exterior angles of a polygon.	Sum of Interior Angles	$(n-2)\times 180$ where n is the number of sides.
		Size of Interior Angle in a Regular Polygon	$\frac{(n-2)\times 180}{n}$ You can also use the formula: $180 - Size\ of\ Exterior\ Angle$
		Size of Exterior Angle in a Regular Polygon	$\frac{360}{n}$ You can also use the formula: $180 - Size\ of\ Interior\ Angle$

Key point

The angles in a quadrilateral add up to 360°.

$a + b + c + d = 360°$



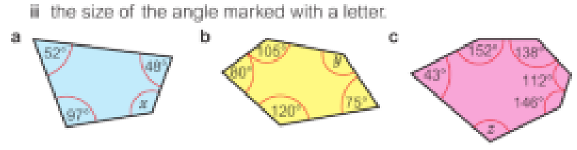
Key point 6

The sum of the exterior angles of a regular polygon is always 360°.

7.5 Solving geometric problems

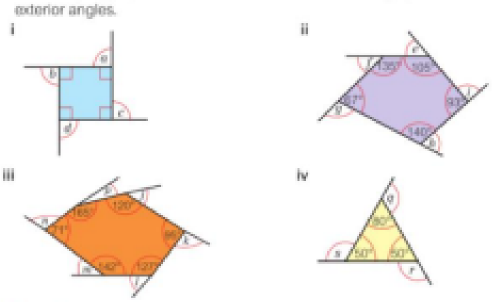
Solve geometrical problems

10 For each irregular polygon, work out
  i the sum of the interior angles
  ii the size of the angle marked with a letter.



10 a i 360° ii $x = 163°$
b i 540° ii $y = 160°$
c i 720° ii $z = 129°$

5 a For each polygon, work out the size of each exterior angle, and then the sum of the exterior angles.



b **Reasoning** What do you notice about the sum of the exterior angles for each shape?

5 a i $a = b = c = d = 90°$
sum = 360°
ii $e = 75°, f = 45°, g = 113°, h = 40°, i = 87°$
sum = 360°
iii $j = 60°, k = 85°, l = 53°, m = 38°, n = 109°, p = 15°$
sum = 360°
iv $q = 100°, r = s = 130°$
sum = 360°
b The sum is always the same.

Try these ...

1. Write which quadrilaterals

a have all sides equal

b have four right angles

c have two pairs of equal sides

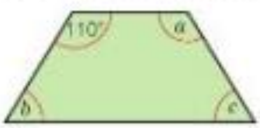
d have exactly one pair of parallel sides

e have bisecting diagonals

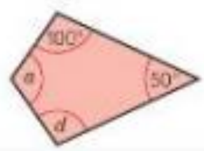
f can have four different sized angles.

2. In this parallelogram, one of the angles is 130°. Work out the sizes of the other angles.

Work out the sizes of the angles marked with letters in this isosceles trapezium.



Work out the sizes of the angles marked with letters in this kite.

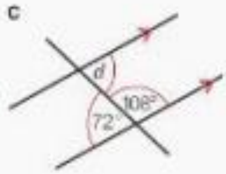


3. **Reasoning** Write the sizes of the angles marked with letters.
Give a reason for each answer.

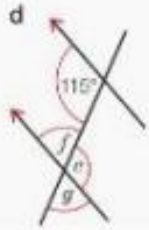
a

b

c

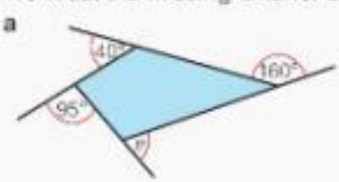


d



4. Work out the missing exterior angles for each of these polygons.

a



b