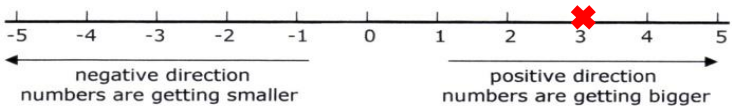
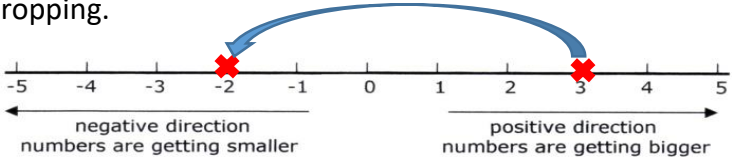


# Knowledge Organiser - E3

Code	Objective
<b>E3.0</b>	<p><b>Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero</b></p> <p>The temperature in Bolton is 3°C. Overnight it drops by 5°C. What is the temperature overnight?</p> <p>Step 1 - Use a number line to help you. Start at 3.</p>  <p>Step 2 – Count up the number line if the temperature is rising and down if it's dropping.</p>  <p style="text-align: center;"><i>Answer: -2</i></p>
<b>E3.1</b>	<p><b>Round numbers and measures to an appropriate degree of accuracy (for example, to a number of decimal places or significant places)</b></p> <p>Round 4.62734 to 2 decimal places</p> <p>Step 1 – Identify the number that is in the 2<sup>nd</sup> decimal place</p> <p style="text-align: center;">4.6<u>2</u>734</p> <p>Step 2 – The number that directly follows this tells you whether to round up or not.</p> <p style="text-align: center;">4.6<u>2</u>734</p> <p>Step 3 – If it is 5 or more you round the 2 up, if it is less than 5 the 2 stays the same. It is a 7 so the 2 rounds up by one digit.</p> <p style="text-align: center;"><i>Answer: 4.6<u>3</u></i></p>
<b>E3.2</b>	<p><b>Use approximation through rounding to estimate answers</b></p> <p>Estimate the answer to <math>437 \times 0.49</math></p> <p>Step 1 – Round each of the numbers to 1 significant figure.</p> <p style="text-align: center;"><u>4</u>37 <math>\approx</math> 400 (don't round up)</p> <p style="text-align: center;">0.<u>4</u>9 <math>\approx</math> 0.5 (round up)</p> <p>Step 2 – Complete the calculation with your rounded values</p> <p style="text-align: center;"><i>Answer: <math>400 \times 0.5 = 200</math></i></p>

**E3.3****Multiply any two positive integers together**

$$738 \times 2946$$

Method 1 – Grid

x	2000	900	40	6
700	1400000	630000	28000	4200
30	60000	27000	1200	180
8	16000	7200	320	48

Now add up the values you have calculated

$$\begin{array}{r}
 1400000 \\
 630000 \\
 28000 \\
 4200 \\
 60000 \\
 27000 \\
 1200 \\
 180 \\
 16000 \\
 7200 \\
 320 \\
 + \quad 48 \\
 \hline
 2174148 \\
 11311 \quad .
 \end{array}$$

Method 2 – Column

$$\begin{array}{r}
 \quad \quad \quad 2946 \\
 \times \quad 738 \\
 \hline
 23568 \quad (8 \times 2946) \\
 \quad 734 \quad . \\
 88380 \quad (30 \times 2946) \\
 \quad 211 \quad . \\
 2062200 \quad (700 \times 2946) \\
 \quad 634 \quad . \\
 \hline
 2174148 \quad (\text{total}) \\
 \quad 1111 \quad . \\
 \text{Answer: } 2174148
 \end{array}$$

**E3.4****Multiply any decimal by a one or two digit number including decimals.**

$$0.576 \times 28$$

Step 1 – Multiply both numbers by 10, 100, 1000... so that they become whole numbers.

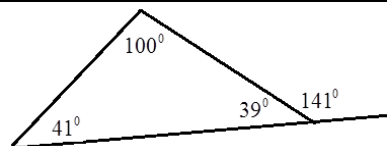
$$0.576 \times 1000 = 576$$

28 is already a whole number so doesn't need to be multiplied

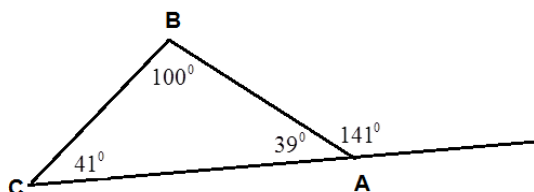
Step 2 – Complete the calculation with these whole numbers using Method 1 or 2 above.  $576 \times 28 = 16128$

Step 3 – Divide your answer by the same numbers you multiplied by in Step 1.

	$16128 \div 1000 = 16.128$ <p style="text-align: center;"><i>Answer: 16.128</i></p>
<b>E3.5</b>	<p><b>Interpret data - Solving problems</b></p> <p>The mean of six numbers is 5. Five of the numbers are 6, 6, 5, 3 and 1. Work out the sixth number.</p> <p>Step 1 – Mean = total of all numbers <math>\div</math> how many numbers there are. So calculate what the total of the 6 numbers should be by multiplying the mean by how many numbers there are.</p> $5 \times 6 = 30$ <p>Step 2 – Calculate the total of the numbers you have been given.</p> $6 + 6 + 5 + 3 + 1 = 21$ <p>Step 3 – The difference between these two is your missing number.</p> $30 - 21 = 7$ <p style="text-align: center;"><i>Answer: 7</i></p>
<b>E3.6</b>	<p><b>Understand and use standard mathematical formulae</b></p> <p>A taxi firm charges 23p per mile and a standard charge of £3. Write down a formulae for the total cost T of travelling d miles.</p> <p>Write all the cost in pounds 23p = £0.23</p> <p>Cost for travelling d miles = <math>d \times £0.23</math></p> <p>Standard charge = £3</p> $T = £3 + d \times £0.23$ $T = 3 + 0.23d$
<b>E3.7</b>	<p><b>Find pairs of numbers which satisfy an equation with two unknowns</b></p> <p>List pair of values of x and y that satisfy</p> $2x - y = 10$ <p>For <math>2x - y = 10</math></p> <p>(5,0) <math>2 \times 5 - 0 = 10</math></p> <p>(6, 2) <math>2 \times 6 - 2 = 10</math></p> <p><b>Use the standard conventions for labelling the sides and angles of triangle ABC</b></p>
<b>E3.8</b>	<p><b>Use the standard conventions for labelling the sides and angles of triangle ABC</b></p> <p>If the angle <math>ABC = 100^\circ</math> label the triangle</p>



This means the angle of  $100^\circ$  is at corner B and the letters are usually in an anticlockwise direction



**E3.9**

**Derive and apply formulae to calculate and solve problems involving the area of triangles, squares, rectangles and parallelograms**

The area of the rectangle is  $37\text{cm}^2$



Find the length of the rectangle

Area of a rectangle = length  $\times$  width

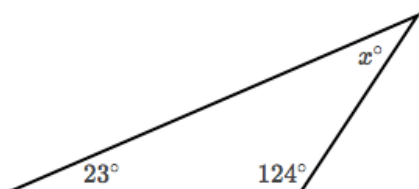
$$\begin{array}{r} 0\ 7.4 \\ 5 \overline{) 37.200} \end{array}$$

So length =  $7.4\text{cm}$  because  $7.4 \times 5 = 37$

**E3.10**

**Apply the properties of angles at a point on a straight line, vertically opposite angles**

Find the angle  $x^\circ$



The angles inside a triangle add to  $180^\circ$

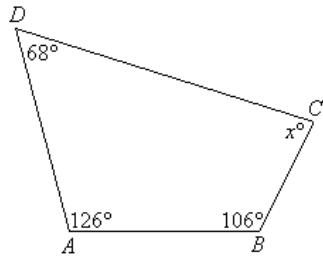
$$23^\circ + 124^\circ = 147^\circ$$

$$180^\circ - 140^\circ = 40^\circ$$

$$180^\circ - 147^\circ = 33^\circ$$

$$\text{so } x = 33^\circ$$

Find the angle  $x^\circ$



Angles in a quadrilateral add to  $360^\circ$

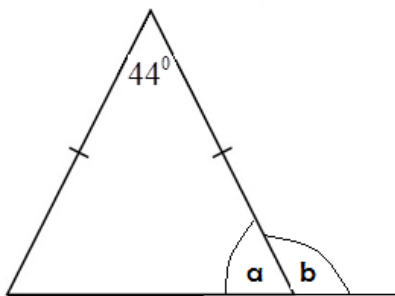
$$\begin{array}{r} 126 \\ + 124 \\ \hline 250 \\ + 68 \\ \hline 318 \end{array} \quad \begin{array}{r} 360 \\ - 300 \\ \hline 60 \end{array}$$

$$x = 60^\circ$$

**E3.11**

**Apply the properties of angles at a point on a straight line, vertically opposite angles**

Find the angles  $a$  and  $b$



An isosceles triangle has two equal sides and the angles opposite the equal sides are the same size.

The angles inside still add to  $180^\circ$

$$180^\circ - 44^\circ = 136^\circ$$

$$\begin{array}{r} 068 \\ 2 \overline{)136} \end{array}$$

$$a = 68^\circ$$

Angles on a straight line add to  $180^\circ$

$$\text{Angle } b = 180^\circ - 68^\circ = 112^\circ$$

**E3.12**

**Change freely between related standard units (for example time, length, area, volume/capacity and mass)**

**Length**

$$1\text{cm} = 10\text{mm}$$

$$1\text{m} = 100\text{cm}$$

$$1\text{km} = 1000\text{m}$$

**Time**

	<p>1 minute = 60 seconds      1 hour = 60 minutes      1 day = 24 hours</p> <p><b>Area</b></p> <p><math>1\text{cm}^2 = 10\text{mm} \times 10\text{mm} = 100\text{mm}^2</math>      <math>1\text{m}^2 = 100\text{cm} \times 100\text{cm} = 10000\text{cm}^2</math></p> <p><b>Volume</b></p> <p><math>1\text{cm}^3 = 1\text{ml}</math>      1 Litre = 1000ml</p> <p><b>Mass</b></p> <p>1kg=1000g</p>
<b>E3.13</b>	<p><b>Use unit pricing to solve problems</b></p> <p>3 apples cost £1.80, how much do 5 apples cost?</p> <p>Step 1 – Calculate the cost of 1 item</p> <p><math>\text{£}1.80 \div 3 \text{ apples} = 60\text{p}</math></p> <p>Step 2 – Multiply this by the number of item you need</p> <p><math>60\text{p} \times 5 \text{ apples} = \text{£}3.00</math></p> <p><i>Answer: £3.00 for 5 apples</i></p>