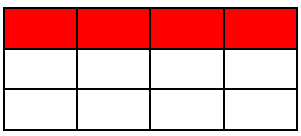
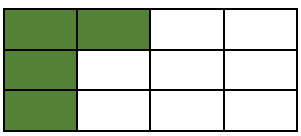
Code	E2 Knowledge Organiser
E2.1	**Add/subtract fractions with denominators all multiples of the same number** **Example:** Calculate $\frac{2}{5}+\frac{3}{15}$ **Step 1:** Identify a common denominator Both 5 and 15 are **factors** of 15. 15 is a **multiple** of both 5 and 15 so common denominator is 15 (you could have other multiples of 5 and 15 but 15 is the **lowest common denominator**. **Step 2:** Use knowledge of equivalent fractions to obtain an equivalent fraction with a common denominator: So $\frac{2}{5}=\frac{6}{15}$ **Step 3:** Rewrite with common denominator: $\frac{6}{15}+\frac{3}{15}$ **Step 4:** Perform the calculation by adding/subtracting the **numerators** $\frac{6}{15}+\frac{3}{15}=\frac{9}{15}$ **Step 5:** Cancel if necessary $\frac{9}{15}=\frac{3}{5}$
E2.2	**Compare and order fractions with denominators all multiples of the same number** **Example:** Put the following fractions in ascending order $\frac{3}{5}$, $\frac{7}{10}$, $1\frac{1}{2}$, $\frac{27}{20}$ **Step 1:** Identify a common denominator 20 is a **multiple** of 5, 10, 2 and 20 so common denominator is 20. **Step 2:** Use knowledge of equivalent fractions to obtain equivalent fractions: $\frac{3}{5}=\frac{12}{20}$, $\frac{7}{10}=\frac{14}{20}$, $1\frac{1}{2}=\frac{3}{2}=\frac{30}{20}$, $\frac{27}{20}$ **Step 3:** Write the fractions in ascending order $\frac{12}{20}$, $\frac{14}{20}$, $\frac{27}{20}$, $\frac{30}{20}$ **Step 4:** Write the fractions in their original format $\frac{3}{5}$, $\frac{7}{10}$, $\frac{27}{20}$, $1\frac{1}{2}$
E2.3	**Recognise and show, using diagrams, families of common equivalent fractions** **Example:** Use a diagram to show that $\frac{1}{3}$ and $\frac{4}{12}$ are the same.  **Step 1:** Identify one out of every three blocks.  **Step 2:** Identify four out of every twelve blocks. **Step 3:** Explain that the same number of blocks are coloured in on each diagram.

E2.4	**Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers** **Example 1:** Find all the **factors** of 100 **Step 1:** Find all the pairs of numbers which multiply together to make 100: 1 x 100, 2 x 50, 4 x 25, 5 x 20, 10 x 10. **Step 2:** Write the numbers in ascending order: 1, 2, 4, 5, 10, 20, 25, 50, 100. These are the **factors** of 100. **Example 2:** List the first 10 multiples of 35 **Step 1:** To find a multiple you **multiply** so work out the times table of the number, so 1 x 35, 2 x 35, 3 x 35 and so on up to the amount of multiples you are asked for (in this case first ten). **Step 2:** Write out the multiples in list format Answer: 35, 70, 105, 140, 175, 210, 245, 280, 315, 350. **Example 3:** Find the **common factors** of 24 and 48 **Step 1:** Find the **factors** of each number and write them in ascending order (see Ex 1) 24 = 1, 2, 3, 4, 6, 8, 12, 24 48 = 1, 2, 3, 4, 6, 8, 12, 16, 24, 48 **Step 2:** Identify which numbers appear in both lists: 1, 2, 3, 4, 6, 8, 12, 24, these are the **common factors**
E2.5	**Positive Powers: Understand indices and apply the four rules (+, - , x and ÷) with powers** **Example 1:** Evaluate 5^4 $5^4 = 5 \times 5 \times 5 \times 5 = 625$ **Example 2:** Show that $9^2 = 3^4$ $9^2 = 9 \times 9 = 81$ $3^4 = 3 \times 3 \times 3 \times 3 = 81$ So $9^2 = 3^4$ **Example 3:** Use a calculator functions to evaluate $13^4 + 2^8$ Use the following keys: $13^4 + 2^8 = 28561 + 256$ = 28817 

E2.6

Writing expressions in words and vice versa

Example 1: Write the following as expressions and vice - versa

(a) 2 multiplied by a
= 2 x a = 2a

(b) Add c to d **and then** multiply 2
= (c + d) x 2
=2(c + d)

(c) Subtract a **from** 10
10 - a

Example 2: Can you write a word equation for this and vice versa

(a) The difference between a and b is 6
a – b = 6

(b) p and q added together is three times as big as a
p + q = 3q

(c) Can you write word sentences for the following 2(a + 5)
a + 5 then all multiplied by 2

E2.7

Use and interpret algebraic notation

Example 1: Simplify the following expressions

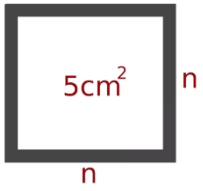
(a) a × b
= ab

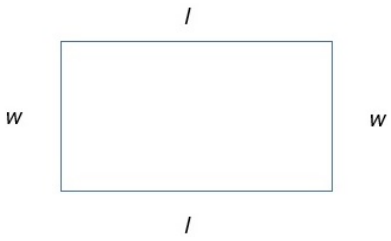
(b) y + y + y
= 3y

(c) a × a × a
= a^3

Example 2: For each of the following shapes, write an expression for their **area**.

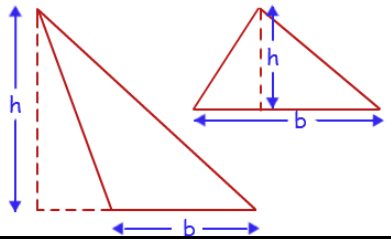
Area = n x n = n^2



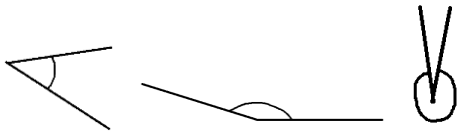
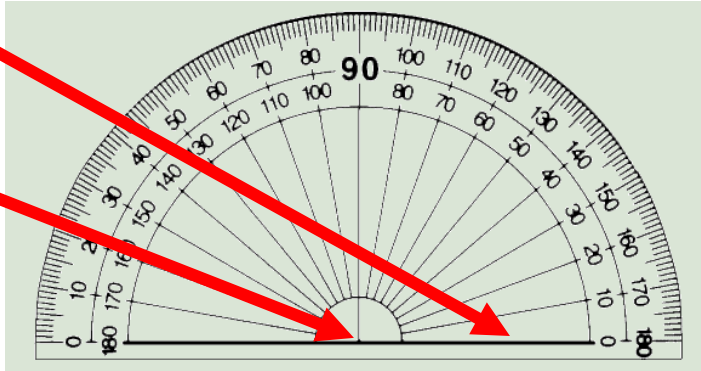
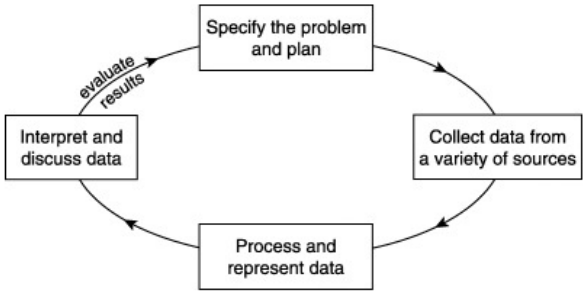


Area = l x w = lw

Area = (b x h) ÷ 2 = $\frac{bh}{2}$



E2.8	**Substitute numerical values into formulae and expressions, including scientific formulae (positive integers only)** **Example 1:** If $P = 5b + 2$, find P when b = 3 P = 5 x 3 + 2 P = 15 + 2 P = 17 **Example 2:** If $F = ma$ where F is 'force', m is 'mass' and a is 'acceleration'. Find the force of an object with mass 10g, moving with acceleration 3m/s^2. m = 10, a = 3 therefore F = ma F = 10 x 3 F = 30 Newtons **Example 3:** If m = 6 and n = 4 find the value of 6m – 3n. 6m – 3n = 6 x 6 – 3 x 4 = 36 – 12 = 24
E2.9	**Use conventional notation for the priority of operations, including brackets and powers. BIDMAS** **Example 1:** Calculate 2 + 5 x 3 2 + 5 x 3 = 2 + 15 = 17 **Example 2:** Calculate 3 x (4 + 5) ÷ 2 3 x (4 + 5) ÷ 2 = 3 x 9 ÷ 2 = 3 x 4.5 = 13.5 **Example 3:** Where should the bracket go to make this sum correct? 25 + 10 – 3 x 20 – 15 = 20 (25 + 10) – 3 x (20 – 15) = 20
E2.10	Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. **Example 1:** What are angles measured in? Ans: Degrees

	Example 2: Estimate the size of these angles.  **Example :** Which of the following are acute angles 170° 65° 14° 235° 90°
E2.11	**Draw given angles and measure them in degrees** **Key Learning Points:** 1. Always place the bottom line of the protractor on the base of your angle. 2. Line up the T with the vertice (corner) of the angle. 3. Note whether 0 starts on the inside or outside. 4. Measure your angle accordingly. 
E2.12	**Understand the different types of data and the data handling cycle.** **Example 1:** Explain the difference between discrete and continuous data Discrete data is data that falls into a distinct category, an example of this is favourite colour. Continuous data can be measured on a scale, eg. Height, weight, time etc. **Example 2:** Explain what is meant by the **handling data cycle** <u>Problem and plan</u> What is the problem and what is your hypothesis?  <u>Collecting data and research</u> What does the existing research say to support/challenge your hypothesis? Conduct your own experiment/data collection activity and record the information you collect. <u>Process and represent</u> Collate the information and use a variety of diagrams/statistical tools to present the data. <u>Interpret, discuss and evaluate</u> What is the data suggesting? What do your analyses suggest? What conclusions can you draw from investigations? How would you improve your experiment/investigation if you did it again?