Year 8
Maths
Spring 1 Level Ladder

Topic: Algebra

All students are expected to master at least the Level 4 content by the end of the half term.

Check Arbor or ask your child what their current working and target level is in Maths

EG:

4A - mastered all of the Level 4 content

4B - mastered some of the Level 4 content

4C - mastered all of the Level 3 content and beginning to master some Level 4 content

3	Previous skills learned (for full examples see Year 7 - Level Ladder - Spring 1 - Algebra): ★ Work out the value of the symbol that makes each of the following statements true. 13 + ☺ = 100 ★ What is the same and what is different about these two number sequences? ★ Look at the thermometer. What temperature is shown? Write your answer in words. New skills to master as well as consolidating any other Level 3 skills: ★ Recognise key terms such as expression, BIDMAS, equation, term and formula in relation to algebra ★ Simple Substitution: If a = 3 and b = 7 what is a + b? ★ Using Algebraic notation: knowing 4x is the same as 4 times an unknown number x
4	Previous skills learned (for full examples see Year 7 - Level Ladder - Spring 1 - Algebra): ★ Use one step function machines. ★ Find co-ordinates in a single quadrant. New skills to master as well as consolidating any other Level 4 skills: ★ Solving equations with one operation, using function machines and then inverse operations.

Q1 – Addition and subtraction

Solve these equations:

$n + 2 = 4$	$n =$ ☐	[1]	$y - 5 = 11$	$y =$ ☐	[1]
$13 = m + 9$	$m =$ ☐	[1]	$t + 15 = 16$	$t =$ ☐	[2]
$q - 8 = 8$	$q =$ ☐	[1]	$15 + g = 16$	$g =$ ☐	[2]

The cost to upgrade from a standard seat to a seat with more legroom is £30.
The standard seat costs s and the upgraded seat costs £340.

Complete the equation that describes this. £☐ = s + £☐ [1]

How much does the standard seat cost (s)? s = £☐ [2]

Q2 – Multiplication and division

Solve these equations:

$b \times 5 = 35$	$b =$ ☐	[1]	$v \div 10 = 7$	$v =$ ☐	[1]
$10c = 100$	$c =$ ☐	[1]	$9w = 6840$	$w =$ ☐	[2]
$x \div 5 = 8$	$x =$ ☐	[1]	$\frac{u}{10} = 2$	$u =$ ☐	[2]

The number of photos a memory stick holds is the memory stick's capacity (c) divided by the size of each photo. The size of each photo is 6 MB and the stick holds 2620 photos.

Complete the equation that describes this. ☐ = c ÷ ☐ MB [1]

What is the memory stick's capacity (c)? c = ☐ MB [2]

5

Previous skills learned (for full examples see Year 7 - Level Ladder - Spring 1 - Algebra):

- ★ Use a function machine to find outputs or inversely inputs and create algebraic formulae from one.
- ★ Using letters to represent unknown numbers in simple formulae. Write a formula for the perimeter of a shape leaving the expression in its simplest form.
- ★ Substitution into expressions formed
- ★ Coordinates in four quadrants
- ★ Insert brackets to make the following calculation true

3 + 4 × 6 - 5 = 7

- ★ Ordering positive and negative numbers

New skills to master as well as consolidating any other Level 5 skills:

- ★ Progressing on to equations with two or more operations. Using function machines and balancing with inverse operations.

  6x + 4 = -44 x = ?

★ Simplifying expressions such as a+a+b+b+b.

★ Expanding by multiplying a term over a single brackets such as 3(3x-2).

★ Carrying out arithmetic in the correct order. Dealing with brackets. BODMAS or BIDMAS.

Answer these questions.

$5 \times (7 + 3) =$ ☐

Fill the gaps.

(☐ - 3) × 5 = 20

6

Previous skills learned (for full examples see Year 7 - Level Ladder - Spring 1 - Algebra):

★ Expand a single bracket

★ Expressing logic problems abstractly in a formula or equation

★ Solve equations with variables on both sides

New skills to master as well as consolidating any other Level 6 skills:

★ Solving equations with brackets

DJ is on holiday. She is not used to using °C for temperatures so she uses the formula:

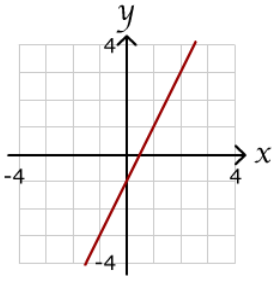
$$\frac{5}{9}(°F - 32) = °C$$

What is 28°C in °F (to the nearest degree)? ☐

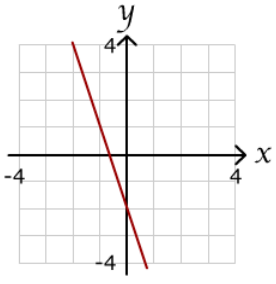
★ Plotting a line when all you are given is an equation such as 2x+y=4.

★ Investigating the effect of changing the values of m and c on the graph with equation y=mx+c.

Work out the equation for each graph.



$y =$ ☐ x ☐ [2]



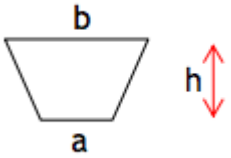
$y =$ ☐ x ☐

★ Finding the gradient of the line joining two points and recognising positive and negative gradients. Using gradient with parallel lines.

Find the gradient of the line between each pair of points.

1 A (4 , 3) and B (6 , 5) Gradient = ☐

★ Factorise by taking out common factors.

	$70pqrs + 30q^2rs - 20qrs = \square(\square)$
7	Previous skills learned (for full examples see Year 7 - Level Ladder - Spring 1 - Algebra): ★ Expanding and simplifying expressions such as (3x+2)(2x+5). ★ Find an expression for the area of a shape with unknown lengths. ★ Substituting into formulae with more than one variable. Includes squares and cubes. ★ Make w the subject of the formula C = 2w + y. ★ Find a formula for the area of this isosceles trapezium. Explain clearly how you found the formula.  New skills to master as well as consolidating any other Level 7 skills: ★ Setting up simultaneous equations and learning how to solve them. These may include negative coefficients or solutions, non integer variables and graphical representations. The cost of 8 CDs and 7 DVDs is £108.40 The cost of 12 CDs and 8 DVDs is £144.60  All the CDs are the same price and all the DVDs are the same price. Find the cost of one of each. 1 CD is £ ☐ 1 DVD is £ ☐ ★ Understanding inequality symbols. Solving linear inequalities. Solve these inequalities on paper and type in your answers. $21 < 4x + 5 < 37$ $19 < 7x - 9 < 33$ $48 < 9x - 6 < 66$ ☐ < x < ☐ ☐ < x < ☐ ☐ < x < ☐ ★ More about how to use the equation y=mx+c. Rearranging the equation to find gradient and intercept. Identifying parallel lines.

8	Previous skills learned (for full examples see Year 7 - Level Ladder - Spring 1 - Algebra): ★ Factorise quadratic expressions fully New skills to master as well as consolidating any other Level 8 skills: ★ Continue developing understanding of algebraic fractions manipulation from Autumn $\frac{1}{x} + \frac{1}{y} =$ ____ $\frac{7}{2x} + \frac{3}{7y} =$ ____ $\frac{x-2}{4x-8} =$ ____ $\frac{x^2+x-12}{x^2+9x+20} =$ ____ $\frac{10x^3}{9} \times \frac{2}{9x} =$ ____ ★ Solving equations that contain fractions by multiplying to eliminate the fraction. $\frac{5}{x-7} - \frac{6}{4x-28} = 9$ $x =$ ____ ★ Rearrange formulae with the subject appearing twice, and with fractions. $y = \frac{x}{x-2}$ $x =$ ____ $9x + v = 4x + w$ $x =$ ____ ★ Using coordinates to find the midpoint between two points, and the length of the line joining two points. ★ Drawing graphs of algebraic functions, including quadratics, cubics, reciprocal and exponential functions. ★ Learning the basic shapes of quadratic, cubic and reciprocal graphs. ★ Sketching the graph of a quadratic without working out pairs of coordinates.