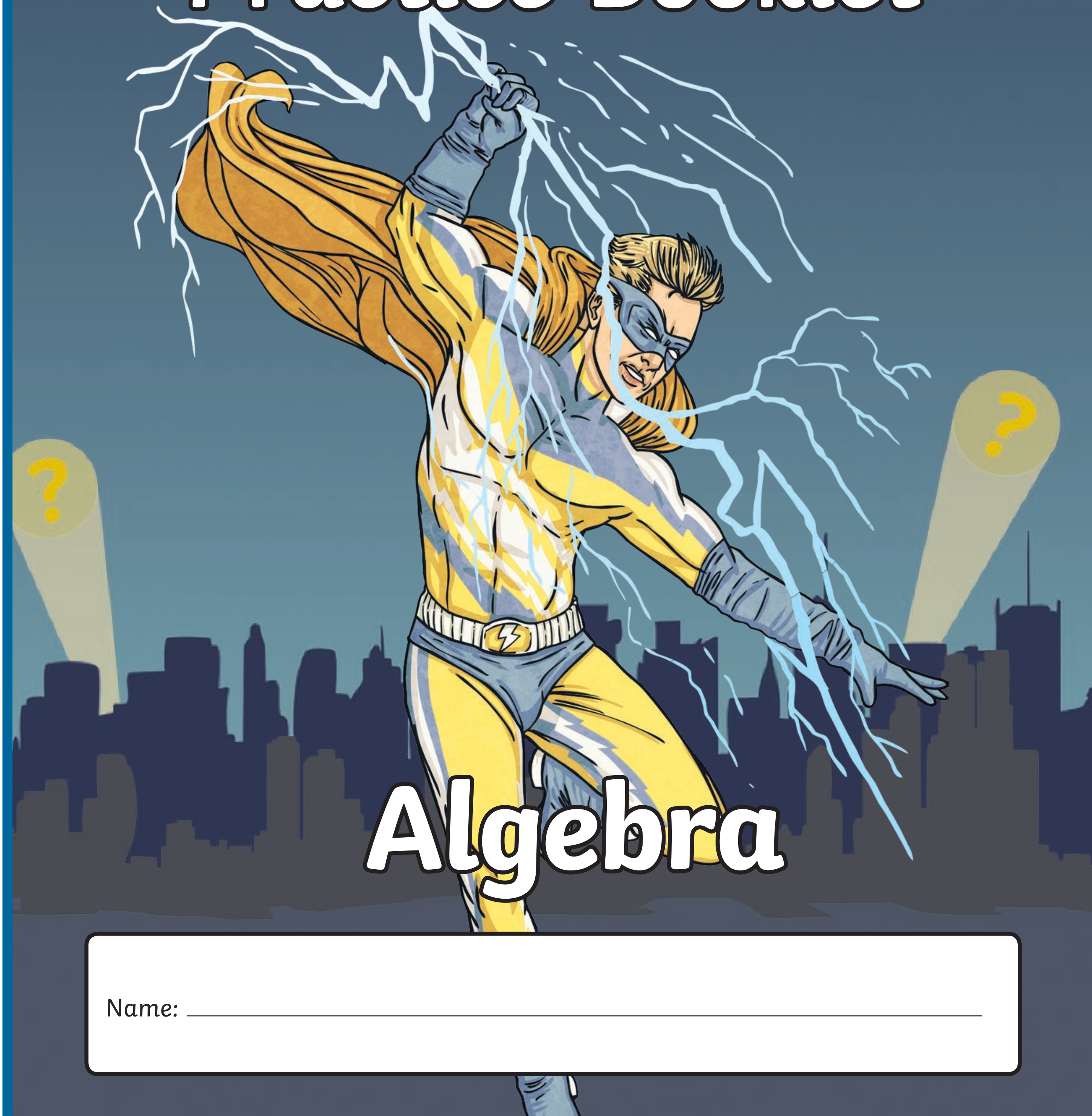
Maths Revision & Practice Booklet



Algebra

Name: ______________________________

Generate and Describe Linear Number Sequences

A linear number sequence is a sequence where each value increases or decreases by the same amount each time. Each number in a linear number sequence is called a term. The constant change between each number is called the term-to-term rule.

To identify the term-to-term rule, find the difference between two adjacent terms. When you know the term-to-term rule, you can use it to find the next number in the sequence.

It can also be used to find a missing number within a sequence. If there are no adjacent terms, find the difference between the closest two terms and divide the difference by the number of terms between them.

-5 -5

33 28 23 18 13 8

+0.4 +0.4 +0.4

0.5 0.9 1.3 1.7 ? ?

$+\frac{2}{5}$ $+\frac{2}{5}$ $+\frac{2}{5}$

$\frac{2}{5}$? $1\frac{1}{5}$ $1\frac{3}{5}$? $2\frac{2}{5}$

+18 +18 +18

127 ? ? 181 ? 217

54 ÷ 3 = 18

Linear Number Sequences and the nth Term

When we want to find any term in a number sequence, we need to use a formula that describes the relationship between the position of the term and the value of the term. We call this the nth term formula. Every linear number sequence has its own nth term formula.

Term Position	**1**	**2**	**3**	**4**	**5**	**6**
Term Value	**5**	**14**	**23**	**32**	**41**	**50**

nth term formula = 9n - 4

The 100th number in the sequence will be

(9 × 100) - 4 = 896

Revise

Express Missing Number Problems Algebraically

In algebra, we use letters or symbols to represent missing values.

Using inverse operations to find these missing values is a basic principal in algebra.

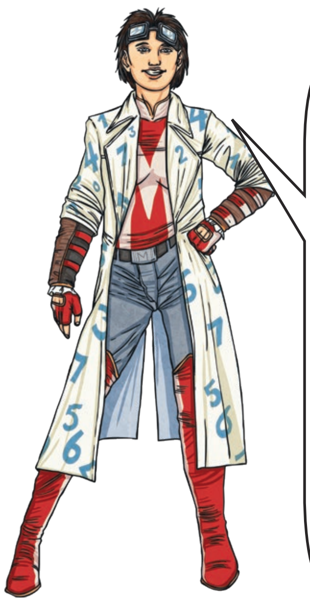
35 + y = 62	The value of y can be found by using subtraction: 62 - 35 = y
6a = 84	The value of a can be found by using division: 84 ÷ 6 = a

Sometimes, you may have to do two different inverse operations to find a missing number.

<table>
<tr><td>5y + 12 = 42</td><td>The value of y can be found using subtraction and division:
$y = \frac{(42 - 12)}{5}$</td><td rowspan="2">In algebra, the multiplication sign is dropped to prevent confusion with the letter x. The division sign is often shown using a fraction line.</td></tr>
<tr><td>9x - 5 = 58</td><td>The value of x can be found by using addition and division:
$x = \frac{(58 + 5)}{9}$</td></tr>
</table>

Using Simple Formulae

A formula shows the relationship between different variables. Variables (x, y, etc.) stand in for values we don't know yet. Formulas show us how things are related to each other. The most common examples of maths formulas are found in the measurement of 2D shapes.



The formula for calculating the area of a rectangle is

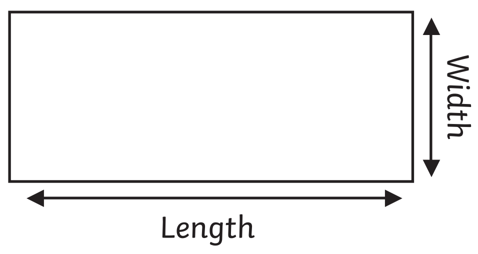
Area = Length × Width

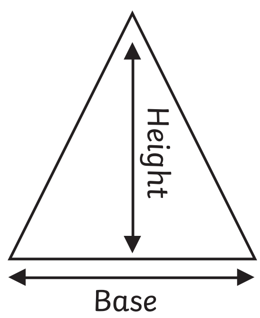
or a = lw

The formula for calculating the area of a triangle is

Area = (base × height) ÷ 2

or $a = \frac{bh}{2}$





Revise

Find Pairs of Numbers that Satisfy an Equation with Two Unknowns

An equation must always balance. The expression on one side of the equal sign must make the same value as the expression (or answer) on the other side.

27 + y = 93	The value of y will be the number that adds to 27 to equal 93.
20 - b = 44 ÷ 11	The value of b will be the number that is subtracted from 20 to equal 4.

Equations can have more than one variable (missing number). When there is more than one variable in an equation, there are different pairs of numbers which will balance the equation.

a + b = 12	**a**	1	2	3	4	5	6
	b	11	10	9	8	7	6

Enumerate Possibilities of Combinations of Two Variables

In some problems, you may be asked to count or list all the different combinations of two variables.

How many different two-digit numbers can be made using the digit cards 1, 2, 3, 4 and 5?

12	21	31	41	51
13	23	32	42	52
14	24	34	43	53
15	25	35	45	54

To find all of the possible combinations to a problem:

- use a system for finding the possibilities;
- organise your findings in an ordered list or table;
- have a way of deciding when all possibilities have been found.

Practise

Supercharge your powers by answering these questions.

1. r stands for a number in row 1.

   w stands for a number in row 2.

   Join all pairs of numbers that match this rule:

   3r - w = 5

   One is done for you.

Row 1	2	3	4	5	6

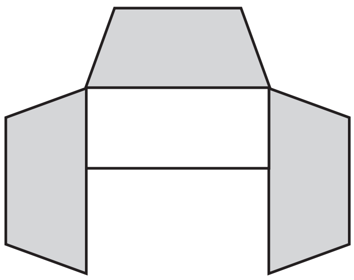
Row 2	4	10	7	13	1

1 mark

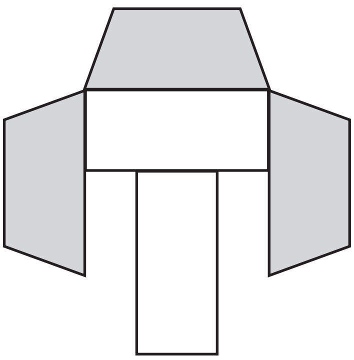
2. I make designs using two different shapes.

   I give the two shapes different values.

   Calculate the value of each shape.



Total value is 167



Total value is 202

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1 mark

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Practise

3. The numbers in this sequence increase by 40 each time.

50, 90, 130, 170, 210

The sequence continues in the same way.

Which number in the sequence will be closest to 400?

1 mark

4. Here is an equation.

$$h = 250 + 3n$$

a) Find the value of h when n = 25.

b) Find the value of n when h = 400.

1 mark

5. I paint a picture using two colours. I have four colours to choose from: red, purple, gold and blue.

Write the two missing combinations.

My painting could be:

red and purple red and gold

red and blue purple and gold

1 mark

total for this page

6. Here is a rule for the time it takes to cook an apple pie.

Cooking time = 15 minutes + 8 minutes for each 500g of chopped apples

a) How many minutes will it take to cook a pie which uses 750g of chopped apples?

minutes

1 mark

7. A shop prints posters. They use this formula to work out the price for printing a poster:

price = (£1.20 × number of colours) + £2

a) What is the price for printing a design that has 3 colours in it?

£

b) I have £10 to spend on printing a design.

What is the greatest number of colours I can have on my poster?

Show your method

colours

1 mark

8. Each shape stands for a number.

 = 72

 = 120

Work out the value of each shape.

 =

 =

1 mark

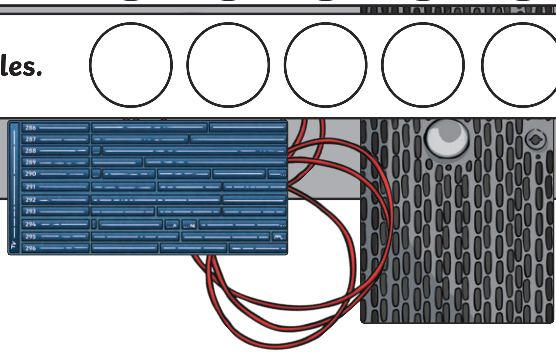
total for this page

Practise

Self-Assessment

Colour in the superhero strength-o-meter to show how you feel about each of these statements:

I can use simple formulae.
I can generate and describe linear number sequences.
I can express missing number problems algebraically.
I can find pairs of numbers that satisfy an equation with two unknowns.
I can find possible of combinations of two variables.



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