Maths SATs Survival

Revision Guide and Quiz

Algebra

Use simple formulae

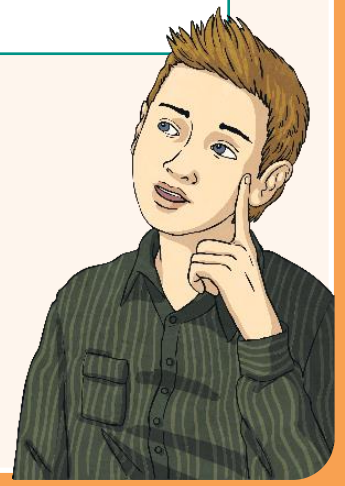
Generate and describe linear number sequences

Linear number sequences and the nth term

Express missing number problems algebraically

Find pairs of numbers that satisfy an equation with two unknowns

Enumerate possibilities of combinations of two variables



Revise

Use simple formulae

Key Vocabulary in Algebra

Equation – A number sentence which uses an equal sign to separate two *expressions* which have the same value.	5 + 15 = 30 – 10
Expression – Groups of numbers, *variables* and operation symbols that give a value.	2y or g + 7
Variable – A value represented by a letter or symbol.	x = 5 *or* y = 3

A formula shows the relationship between different variables.

The values of the variables may change but the relationship between them stays the same.

The most common examples of formulas are found in the measurement of 2D shapes.

Remember that in algebra the multiplication sign is dropped to prevent confusion with the letter x, and the division sign is shown using a fraction line.

Formula for calculating the area of a rectangle:

$$\text{Area} = \text{Length} \times \text{Width}$$
$$a = lw$$

Formula for calculating the area of a triangle:

$$\text{Area} = (\text{base} \times \text{height}) \div 2$$
$$a = \frac{bh}{2}$$

Quiz

Use simple formulae

Identify if this statement is true or false.

There are 236 packets of balloons and each packet contains 28 balloons.
Altogether there are more than 6000 balloons.

True

False

Try again!

Quiz

Use simple formulae

Identify if this statement is true or false.

There are 150 beans in a can of beans.
If there are 6450 beans altogether,
then over 40 tins have been opened.

True

False

Try again!

Quiz

Use simple formulae

Use the formulae Area = Length × Width to calculate the area of this rectangle.

31.1cm²

31.4cm²

31.2cm²

Correct!

Try again!

Quiz

Use simple formulae

Use the formulae Area = (base × height) ÷ 2 to calculate the area of a triangle with a base of 12cm and height of 15.5cm.

93cm²

186cm²

95cm²

Choose another objective

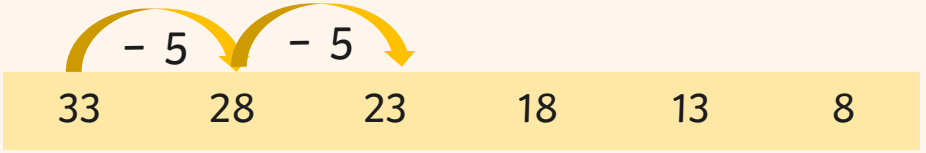
Try again!

Revise

Generate and describe linear number sequences

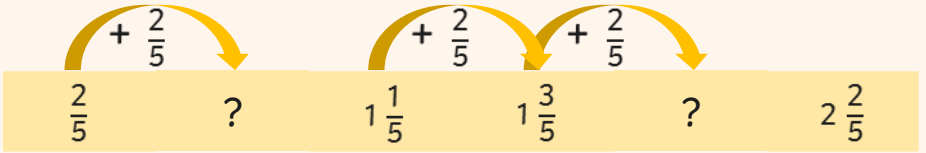
A linear number sequence is a sequence where each value increases or decreases by the same amount each time. Each number in a linear number sequence is called a **term**. The constant change between each number is called the **term to term rule**.

To identify the term to term rule, find the difference between two adjacent terms.

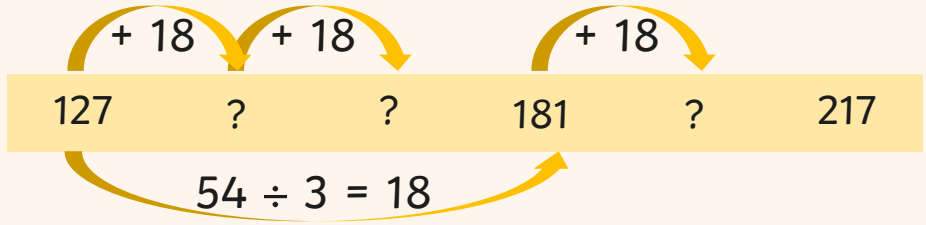


When you know the term to term rule, you can use it to find the next number in the sequence.

It can also be used to find a missing number within a sequence.



Sometimes there may be no adjacent terms to use to find the term to term rule. In this instance find the difference between the closest two terms, and divide the difference by the number of terms between them.



Quiz

Generate and describe linear number sequences

What is the next number in this linear number sequence?

16, 31, 46, 61, ?

76

71

66

Try again!

Quiz

Generate and describe linear number sequences

What is the next number in this linear number sequence?

145, 123, ?, 79, 57

99

102

101

Try again!

Quiz

Generate and describe linear number sequences

What is the term to term rule for this linear number sequence?

57, ?, ?, 171, 209

+ 37

+ 38

+ 39

Try again!

Quiz

Generate and describe linear number sequences

What is the next number in this linear number sequence?

22, 14, 6, −2, ?

− 6

− 8

− 10

Correct!

Quiz

Generate and describe linear number sequences

What is the next number in this linear number sequence?

$\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{8}$, $1\frac{1}{2}$, $1\frac{7}{8}$, ?

$2\frac{1}{2}$

$2\frac{1}{4}$

$2\frac{1}{8}$

Choose another objective

Try again!

Revise

Linear number sequences and the nth term formula

The **term to term rule** is useful for finding the next term in a number sequence or finding missing terms within a number sequence. However, it is not an effective way of finding **any** term in a number sequence. For example, to find the **100th term** we would have to write every term up to this; which would create an extremely long sequence and take too much time!

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 it's 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

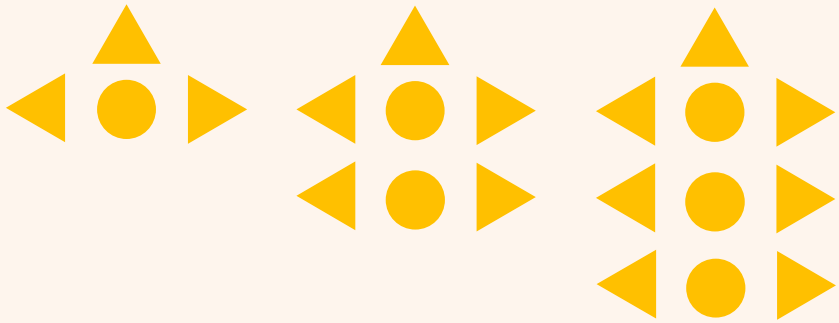
The 100th number in the sequence will be
(9 × 100) – 4 = 896

The 134th number in the sequence will be
(9 × 134) – 4 = 1202

Quiz

Linear number sequences and the nth term formula

The nth term formula can also be used to predict sequences in patterns.



Circles	Triangles
1	3
2	5
3	7
(2 × circles) + 1 = triangles	

How many triangles will there be when there are twenty circles?

Answer
(20 × 2) + 1 = 40 + 1 = 41 triangles

Quiz

Linear number sequences and the nth term formula

In a linear number sequence that has the nth term formula 5n + 3, what will the 50th term be?

253

203

303

Correct!

Quiz

Linear number sequences and the nth term formula

In a linear number sequence that has the nth term formula 6n – 12, what will the 85th term be?

500

499

498

Correct!

Try again!

Quiz

Linear number sequences and the nth term formula

Identify if this statement is true or false.

The 125th term in a linear sequence with the nth term formula 8n + 23 is 1033.

True

False

Choose another objective

Try again!

Revise

Express missing number problems algebraically

In algebra, we use letters or symbols to represent missing values.
These are known as variables.
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: $84 \div 6 = a$

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

5y + 12 = 47	The value of y can be found by using subtraction and division: $y = \frac{(47 - 12)}{5}$
9x − 5 = 58	The value of x can be found by using addition and division: $x = \frac{58 + 5}{9}$

In algebra, the multiplication sign is dropped to prevent confusion with the letter x, and the division sign is often shown using a fraction line.

Quiz

Express missing number problems algebraically

What is the answer to the number riddle?

I start with a number.
I multiply it by 5.
I add 10.
I multiply by 2.
I end with the number 130.
What number did I start with?

9

10

11

Try again!

Quiz

Express missing number problems algebraically

What is the answer to the number riddle?

I start with a number.
I multiply it by 4.
I add 8.
I divide by 12.
I add 12.
I end with the number 15.
What number did I start with?

6

7

8

Try again!

Quiz

Express missing number problems algebraically

What is the value of d in this equation?

$$\frac{d}{7} = 175$$

1224

1225

1226

Try again!

Quiz

Express missing number problems algebraically

What is the value of f in this equation?

$$8f - 134 = 538$$

84

85

86

Try again!

Quiz

Express missing number problems algebraically

What is the answer to this problem?

Dan spent half of his pocket money on going to the cinema. He then helped to wash the car and was given £5.75. He now has £15.80 pocket money. How much pocket money did Dan start with?

£31.60

£10.05

£20.10

Choose another objective

Try again!

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 of the equals sign.

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

When you are asked to find all the pairs of numbers that balance an equation, it is important to work systematically. Sometimes you might be asked to find pairs of numbers within a criteria.

a − b = 9

Find pairs of numbers that are whole numbers between 10 and 25.

a	19	20	21	22	23	24	25
b	10	11	12	13	14	15	16

Quiz

Find pairs of numbers that satisfy an equation with two unknowns

Which pair of numbers **will** satisfy this equation?

$$a + b = 2378$$

$a = 1830$ $b = 550$	$a = 1828$ $b = 550$	$a = 1818$ $b = 550$

Correct!

Quiz

Find pairs of numbers that satisfy an equation with two unknowns

Which pair of numbers **will not** satisfy this equation?

$$ef = 96$$

$e = 32$
$f = 3$

$e = 4$
$f = 24$

$e = 13$
$f = 7$

Try again!

Quiz

Find pairs of numbers that satisfy an equation with two unknowns

Which pair of numbers **will** satisfy this equation?

$$7c - 2d = 36$$

c = 10 d = 15	c = 12 d = 24	c = 9 d = 14

Correct!

Try again!

Quiz

Find pairs of numbers that satisfy an equation with two unknowns

Which pair of numbers **will not** answer this problem?

An apple costs 8p and a banana costs 10p. Manahil spent £3.26 on apples and bananas at the supermarket.
How many of each could she buy?

20 apples
16 bananas

22 apples
15 bananas

27 apples
11 bananas

Choose another objective

Try again!

Revise

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

Top tips for finding all possible combinations to a problem are:

- 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.

Quiz

Enumerate possibilities of combinations of two variables

How many different three-digit numbers can be made using the digit cards 5, 6, 7, 8 and 9?

55

60

65

Choose another objective

Try again!