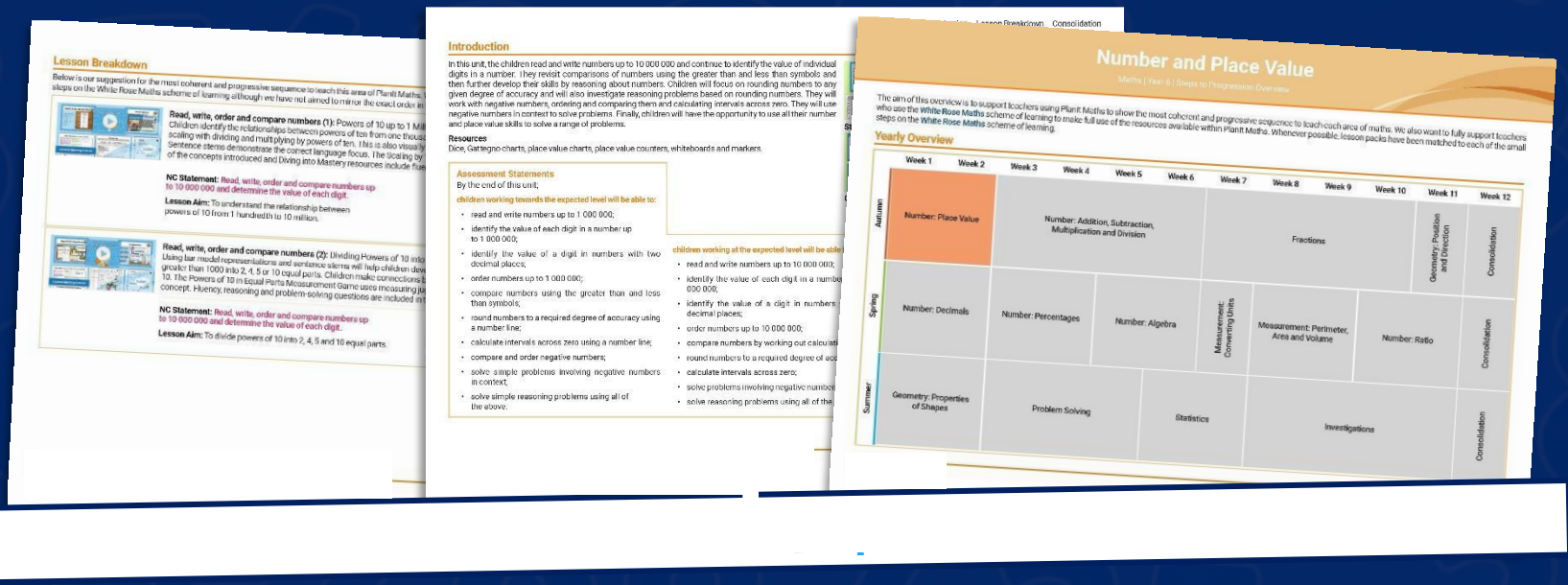
Maths

Number and Place Value

Need a coherently planned sequence of lessons to complement this resource?



Calculating Intervals Across Zero

Aim

- To calculate intervals across zero.

Success Criteria

- I can use a number line to calculate with negative numbers.
- I can solve additions and subtractions above, below and across zero.

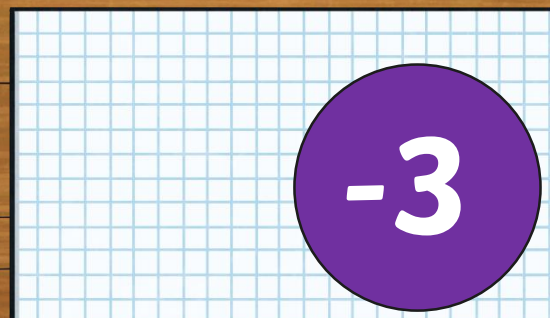
Remember It

Complete the table, rounding each of the numbers to the required degree of accuracy.

Number	Round to nearest 10	Round to nearest 100	Round to nearest 1 000	Round to nearest 10 000	Round to nearest 100 000	Round to nearest 1 000 000
999	1000	1000	1000	0	0	0
138 329	138 330	138 300	138 000	140 000	100 000	0
2 192 993	2 192 990	2 193 000	2 193 000	2 190 000	2 200 000	2 000 000

Negative Numbers

Negative numbers are numbers below zero. They are expressed with a minus sign before the number, like this:

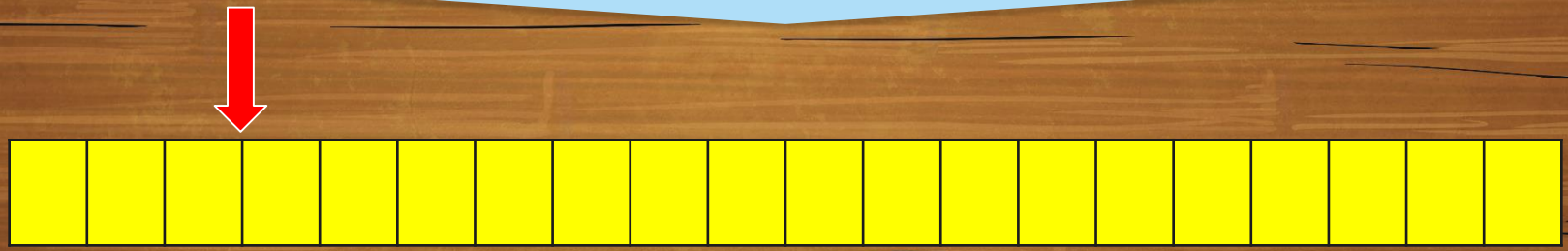


We can use negative numbers to describe values on scales that go below zero, such as temperature scales, or to express an absence or opposite of something.

Negative numbers are the opposite of positive numbers. Positive numbers increase above zero, and negative numbers decrease below zero. The greater the negative number, the further below zero it is.

Negative Numbers

When calculating with negative numbers, we can use a number line to help when crossing zero (from positive to negative or negative to positive). Each section within a number line is known as an interval.



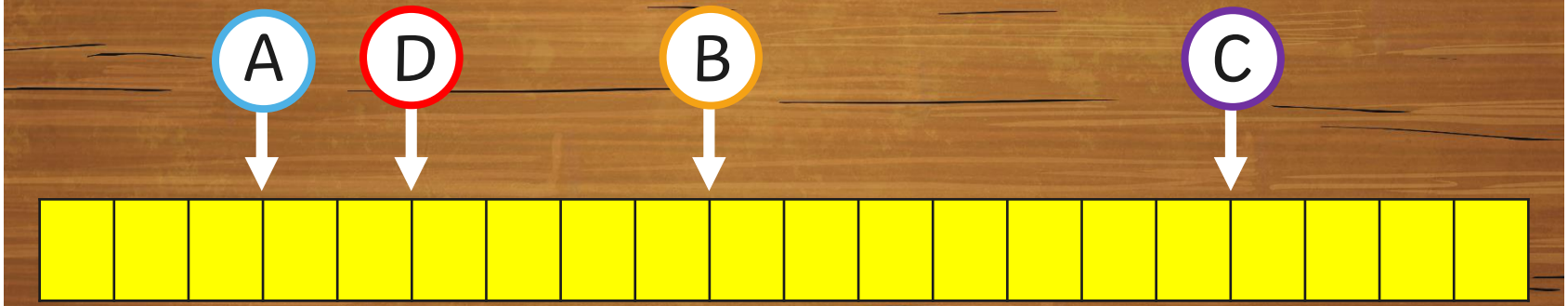
Which number does the red arrow point to on the number line?

-7

The answer is pronounced negative 7.

Negative Numbers

Find the values of A, B, C and D.



A =

B =

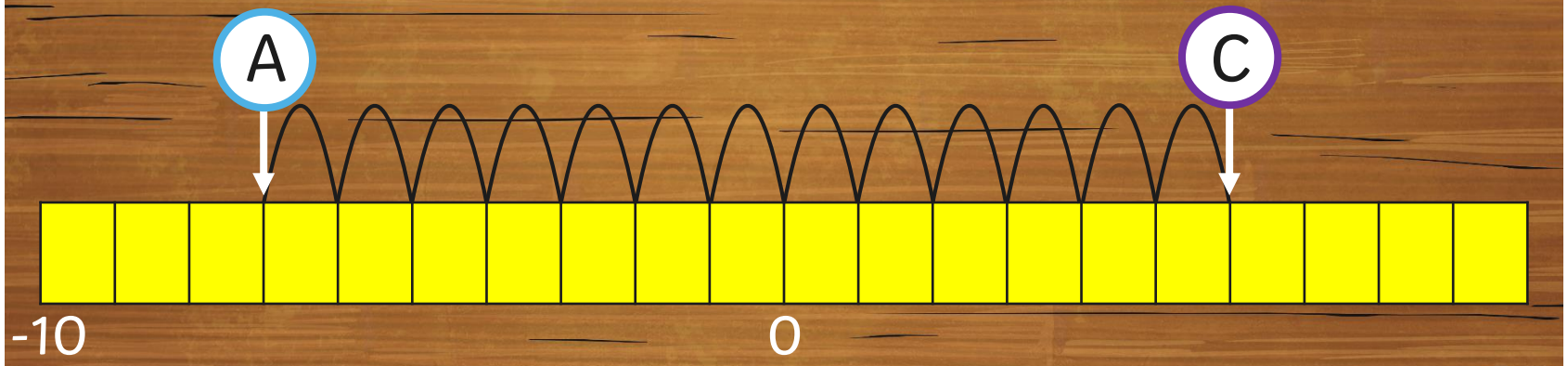
C =

D =

Negative Numbers

Whole Class

What is the difference between the values of A and C?



A is -7

C is 6

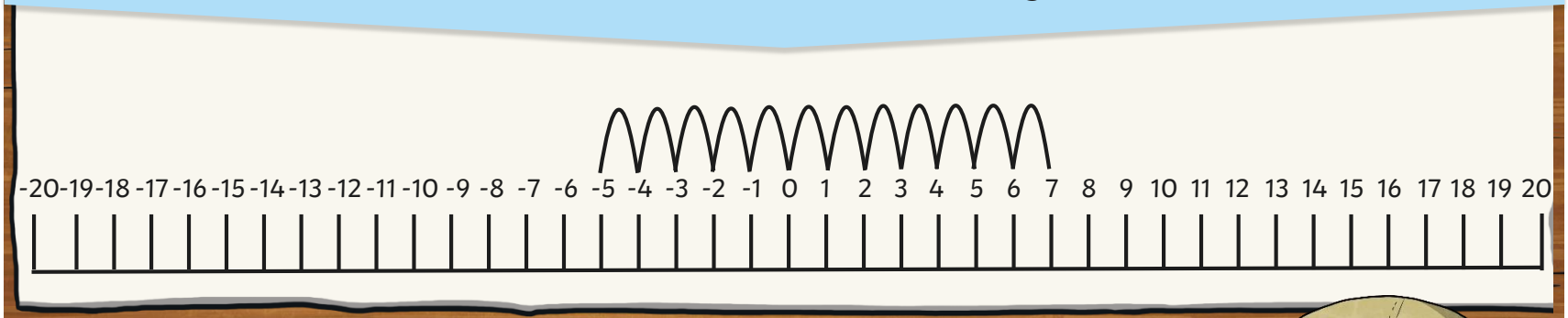
The difference between A and C is 13.

Counting the intervals between each letter helps to find the difference.

Negative Numbers

When calculating with negative numbers, we often cross zero.

For example, 7 - 12 crosses zero to get to -5.



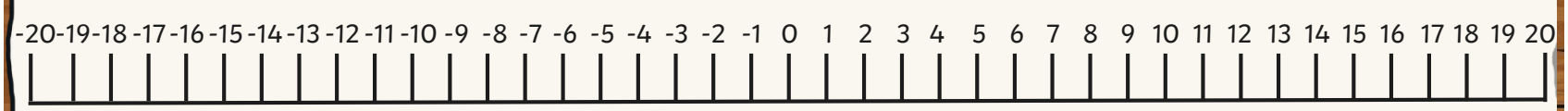
We start at 7, then count back 12 steps.

We cross zero to reach - 5.

7 - 12 = -5

Negative Numbers

Find the answers to these calculations involving crossing zero.
How did you do?
You can use the number line to help you.



9 - 17 = -8	5 = -8 + 13
13 - 20 = -7	6 - 10 = -4
-13 = 4 - 17	-3 + 9 = 6

Calculating Intervals Across Zero

Use a number line to help answer the negative number problem.

-20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

I start at 10.

I subtract 13.

I add 11.

What number do I land on?

8

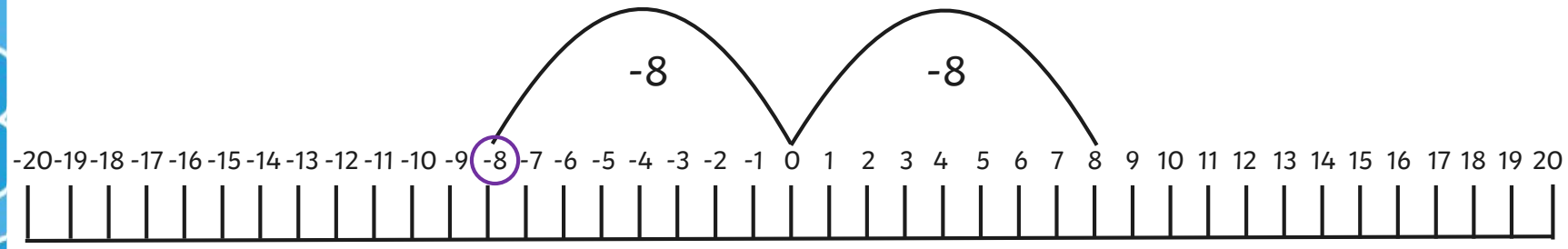
Calculating Intervals Across Zero

Carlton is counting using a number line.
He starts on 8 and counts back 16.

Carlton finishes on -9.

Is this true or false?

False. Carlton should land on negative 8, rather than negative 9.



Instead of counting backwards in single intervals, larger subtractions can be made to calculate the answer. In this example, 16 is partitioned into two lots of 8. Each subtraction of 8 is then shown on the number line.

Calculating Intervals Across Zero

Use a number line to help answer the negative number problem.

-20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

I start at a number.

I move forwards by 12 intervals.

I move backwards by 9 intervals.

I land on -10.

Which number did I start at?

-13

Find a Path

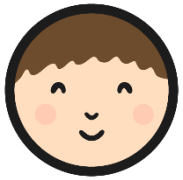
Can you find a path through this maze?

Start at 3. Follow the calculations to get through the maze and make it back to 3 again.

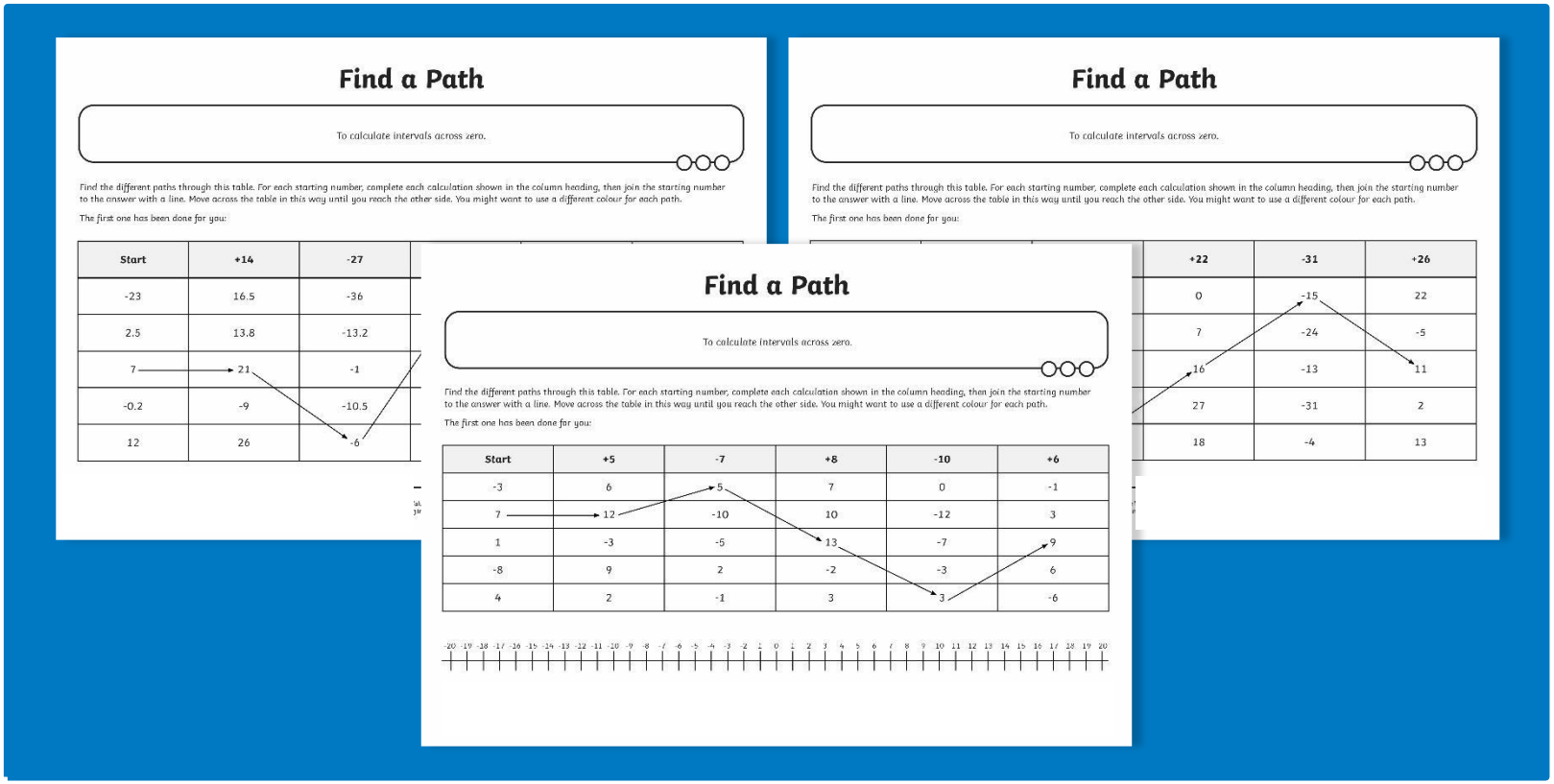
1. 3 – 9 = -6	**2.** -6 + 13 = 7	**3.** 7 – 10 = -3	**4.** -3 + 6 = 3

	1	-5	-3	
3	-6	8	5	**3**
	-9	-10	9	
	10	7	-7	

Find a Path Activity



Complete your **Find a Path Activity Sheet** by calculating the intervals across zero and finding the different paths through the maze.



Find a Path

To calculate intervals across zero.

Find the different paths through this table. For each starting number, complete each calculation shown in the column heading, then join the starting number to the answer with a line. Move across the table in this way until you reach the other side. You might want to use a different colour for each path.

The first one has been done for you:

Start	+14	-27
-23	16.5	-36
2.5	13.8	-13.2
7	21	-1
-0.2	-9	-10.5
12	26	-6

Find a Path

To calculate intervals across zero.

Find the different paths through this table. For each starting number, complete each calculation shown in the column heading, then join the starting number to the answer with a line. Move across the table in this way until you reach the other side. You might want to use a different colour for each path.

The first one has been done for you:

	+22	-31	+26
	0	-15	22
	7	-24	-5
	16	-13	11
	27	-31	2
	18	-4	13

Find a Path

To calculate intervals across zero.

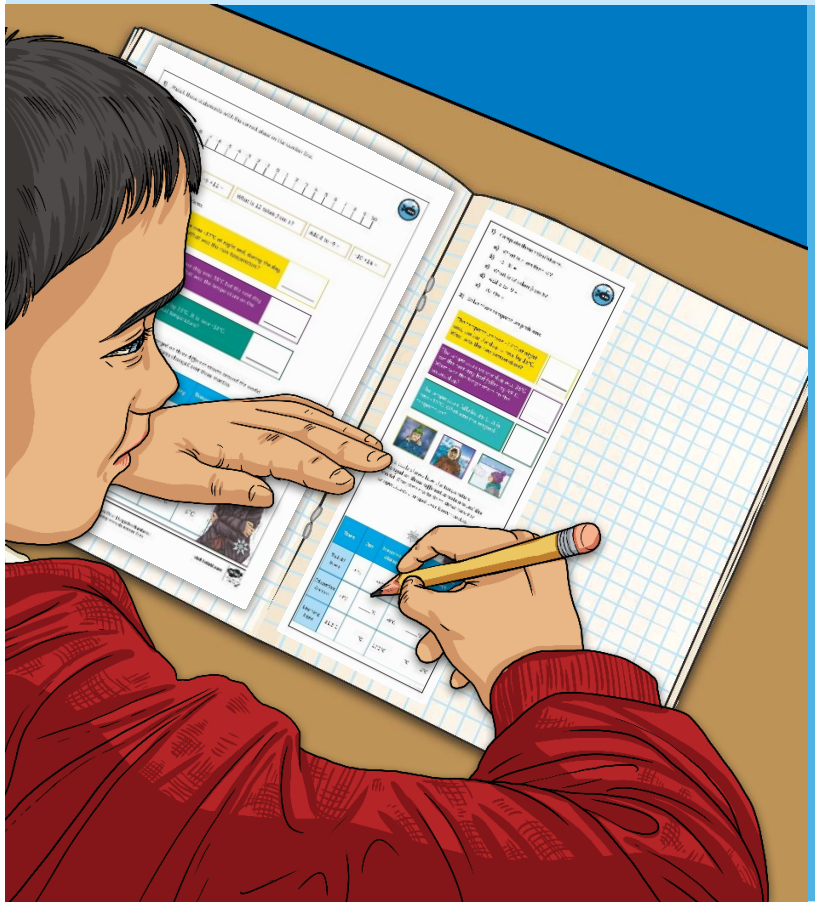
Find the different paths through this table. For each starting number, complete each calculation shown in the column heading, then join the starting number to the answer with a line. Move across the table in this way until you reach the other side. You might want to use a different colour for each path.

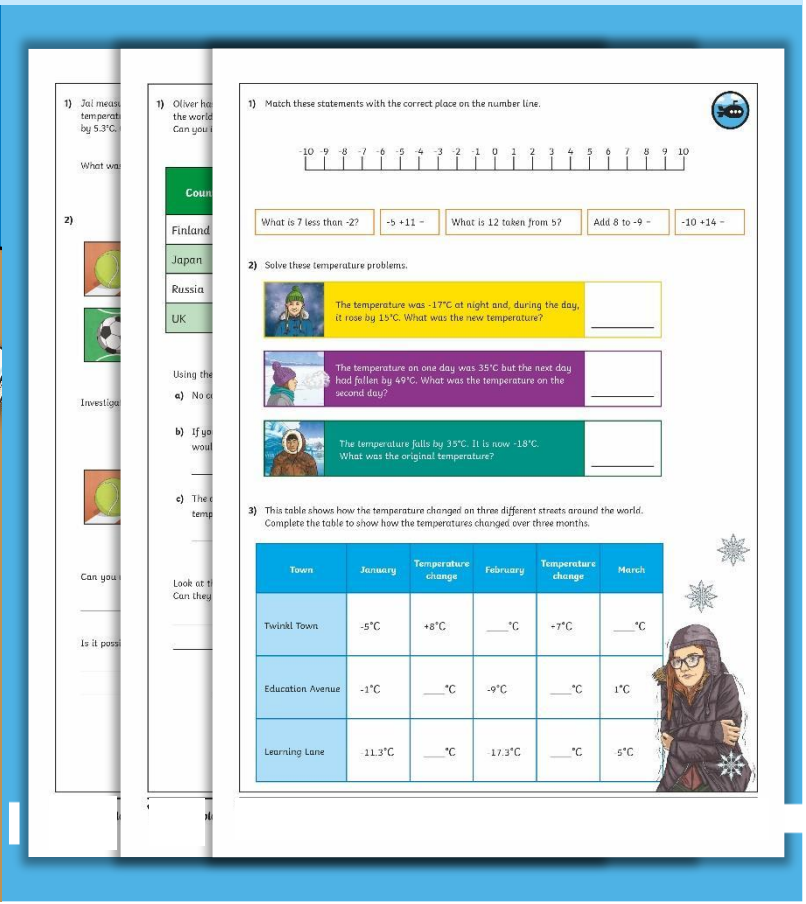
The first one has been done for you:

Start	+5	-7	+8	-10	+6
-3	6	5	7	0	-1
7	12	-10	10	-12	3
1	-3	-5	13	-7	9
-8	9	2	-2	-3	6
4	2	-1	3	3	-6

Diving into Mastery

Dive in by completing your own activity!





1) Match these statements with the correct place on the number line.

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

What is 7 less than -2?	-5 +11 =	What is 12 taken from 5?	Add 8 to -9 =	-10 +14 =

2) Solve these temperature problems.

The temperature was -17°C at night and, during the day, it rose by 15°C. What was the new temperature? _____

The temperature on one day was 35°C but the next day had fallen by 49°C. What was the temperature on the second day? _____

The temperature falls by 35°C. It is now -18°C. What was the original temperature? _____

3) This table shows how the temperature changed on three different streets around the world. Complete the table to show how the temperatures changed over three months.

Town	January	Temperature change	February	Temperature change	March
Twinkl Town	-5°C	+8°C	____°C	-7°C	____°C
Education Avenue	-1°C	____°C	-9°C	____°C	1°C
Learning Lane	-11.3°C	____°C	-17.3°C	____°C	5°C

Crossing Zero

The difference between A and B is 100.

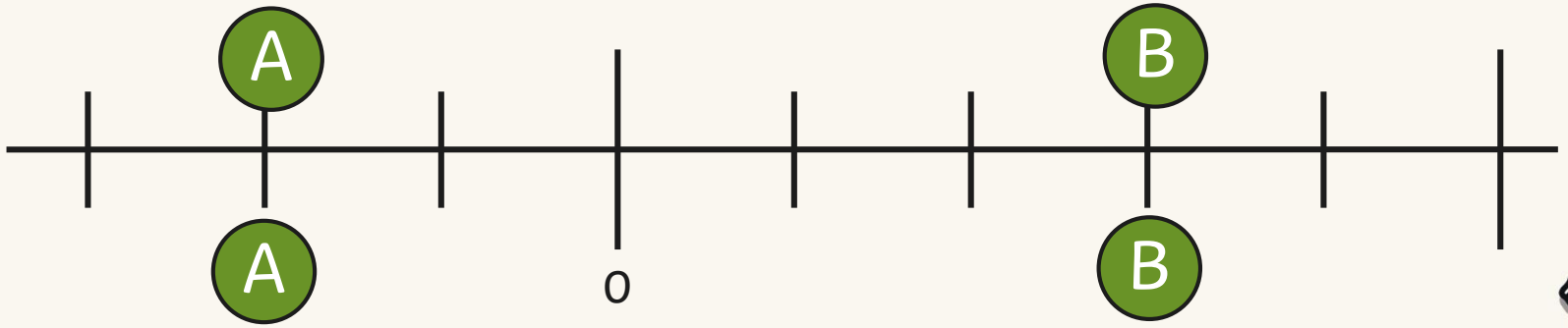
Did you find the value of A and B?

Can you find the value of A and B?

To do this, we need to split the overall difference of 100 into the number of intervals between the two values.

There are five intervals, so we calculate 100 ÷ 5, which is 20.

We know that each interval is worth 20. A is two intervals below zero, so A is worth -40. B is three intervals above zero, so B is worth 60.



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