



# Maths

## Number and Place Value

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

**Lesson Breakdown**

Below is our suggestion for the most coherent and progressive sequence to teach this area of PlanIt Maths. Steps on the White Rose Maths scheme of learning although we have not aimed to mirror the exact order in which they are presented.

**Read, write, order and compare numbers (1): Powers of 10 up to 1 Mill**  
 Children identify the relationships between powers of ten from one thousand to one million. They use bar models to show how powers of ten are related. Sentence stems demonstrate the correct language focus. The listing by of the concepts introduced and being into Mastery resources include further resources.

**NC Statement:** Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.  
**Lesson Aim:** To understand the relationship between powers of 10 from 1 hundredth to 10 million.

**Read, write, order and compare numbers (2): Dividing Powers of 10 into groups greater than 1000 into 2, 4, 5 or 10 equal parts. Children make connections between the Powers of 10 in Equal Parts Measurement Game, using measuring in context. Fluency, reasoning and problem-solving questions are included in the game.**

**NC Statement:** Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.  
**Lesson Aim:** To divide powers of 10 into 2, 4, 5 and 10 equal parts.

**Introduction**

In this unit, the children read and write numbers up to 10 000 000 and continue to identify the value of individual digits in a number. They revisit comparisons of numbers using the greater than and less than symbols and then further develop their skills by reasoning about numbers. Children will focus on rounding numbers to any given degree of accuracy and will also investigate reasoning problems based on rounding numbers. They will work with negative numbers, ordering and comparing them and calculating intervals across zero. They will use negative numbers in context to solve problems. Finally, children will have the opportunity to use all their number and place value skills to solve a range of problems.

**Resources**  
 Dice, Gattegno charts, place value charts, place value counters, whiteboards and markers.

**Assessment Statements**  
 By the end of this unit, children working towards the expected level will be able to:

- read and write numbers up to 1 000 000;
- identify the value of each digit in a number up to 1 000 000;
- identify the value of a digit in numbers with two decimal places;
- order numbers up to 1 000 000;
- compare numbers using the greater than and less than symbols;
- round numbers to a required degree of accuracy using a number line;
- calculate intervals across zero using a number line;
- compare and order negative numbers;
- solve simple problems involving negative numbers in context;
- solve simple reasoning problems using all of the above.

children working at the expected level will be able to:

- read and write numbers up to 10 000 000;
- identify the value of each digit in a number 000 000;
- identify the value of a digit in numbers with decimal places;
- order numbers up to 10 000 000;
- compare numbers by working out calculations to a required degree of accuracy;
- round numbers to a required degree of accuracy;
- calculate intervals across zero;
- solve problems involving negative numbers in context;
- solve reasoning problems using all of the above.

**Number and Place Value**  
 Maths | Year 6 | Skills to Progress Overview

The aim of the overview is to support teachers using PlanIt Maths to show the most coherent and progressive sequence to teach each area of maths. We also want to fully support teachers who use the White Rose Maths scheme of learning to make full use of the resources available within PlanIt Maths. Wherever possible, lesson packs have been matched to each of the small steps on the White Rose Maths scheme of learning.

**Yearly Overview**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	
Autumn	Number: Place Value			Number: Addition, Subtraction, Multiplication and Division					Fractions			Ordering: Position and Direction	Consolidation
Spring		Number: Decimals		Number: Percentages		Number: Algebra	Measurement: Converting Units		Measurement: Perimeter, Area and Volume		Number: Ratio		Consolidation
Summer	Geometry: Properties of Shapes			Problem Solving			Statistics			Investigations			Consolidation

# 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:

$-3$

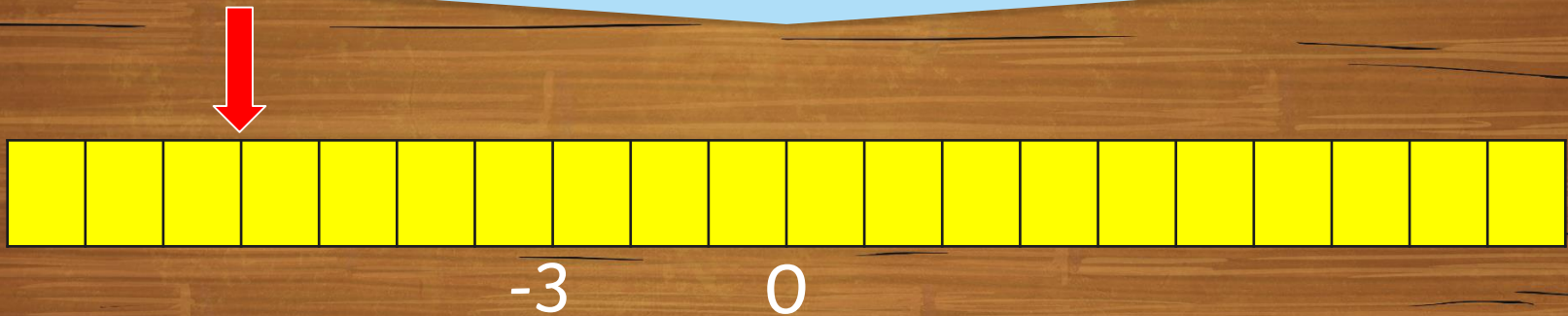
We can use negative numbers to describe values on scales that go below zero, such as temperature scales, or to express an absence or opposite of something.

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.



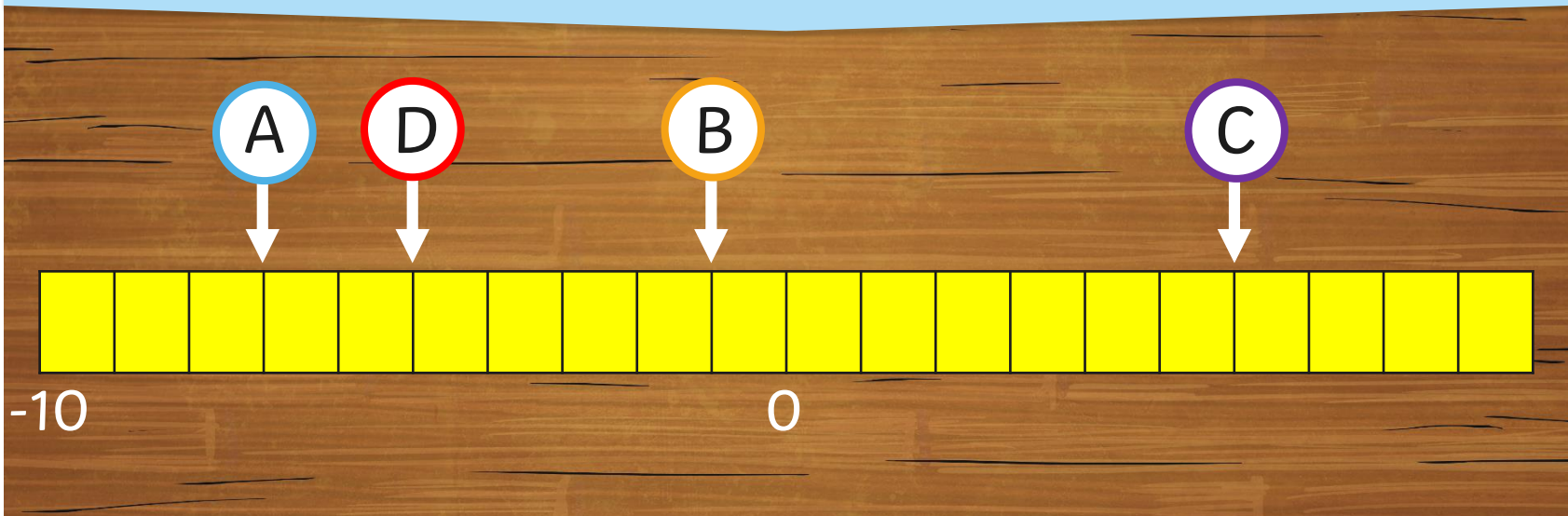
The answer is pronounced negative 7.

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

# Negative Numbers



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



A =

B =

C =

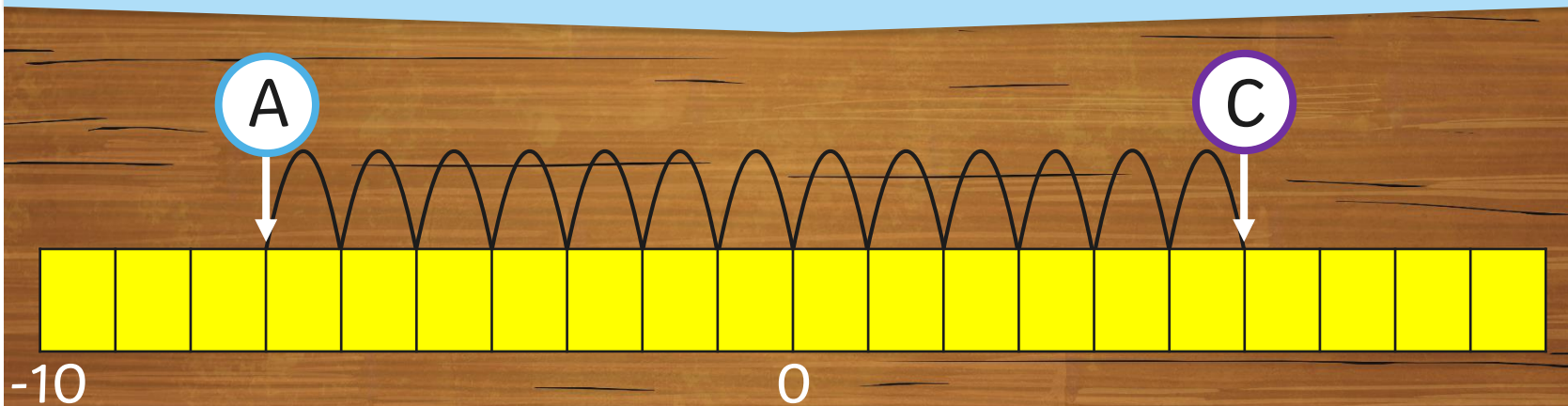
D =



# Negative Numbers



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.

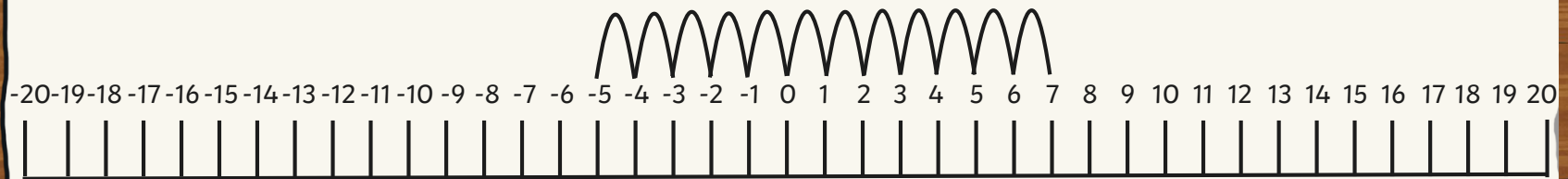
Counting the intervals between each letter helps to find the difference.

# 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  $-5$ .

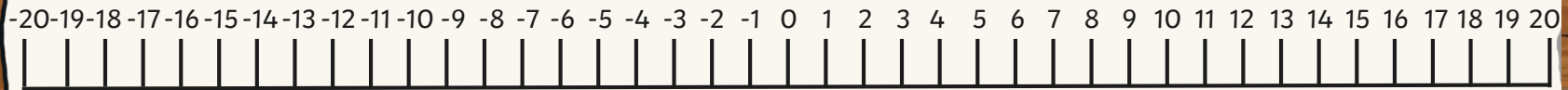
$$7 - 12 = -5$$



# Negative Numbers



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



$$9 - 17 = \underline{-8}$$

$$\underline{5} = -8 + 13$$

$$13 - 20 = \underline{-7}$$

$$6 - 10 = \underline{-4}$$

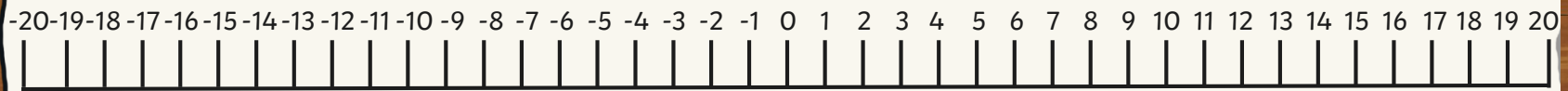
$$\underline{-13} = 4 - 17$$

$$-3 + 9 = \underline{6}$$

# Calculating Intervals Across Zero



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



I start at 10.

I subtract 13.

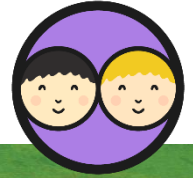
I add 11.

What number do I land on?

8



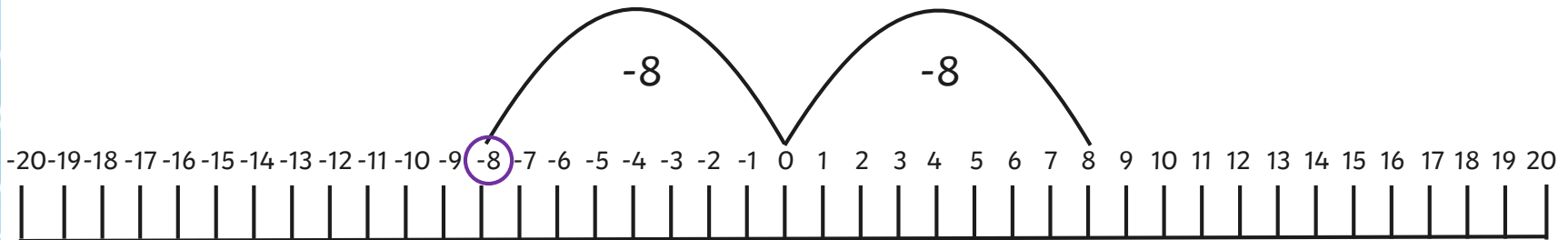
# Calculating Intervals Across Zero



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.

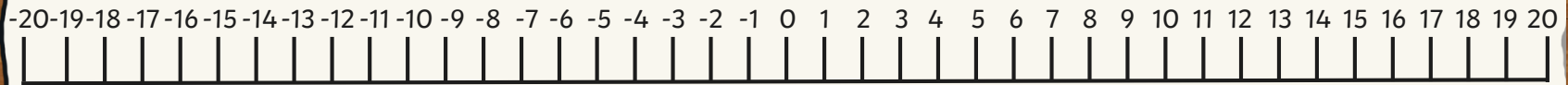


Instead of counting backwards in single intervals, larger subtractions can be made to calculate the answer. In this example, 16 is partitioned into two lots of 8. Each subtraction of 8 is then shown on the number line.

# Calculating Intervals Across Zero



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



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?

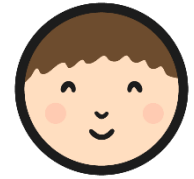
Start at 3. Follow the calculations to get through the maze and make it back to 3 again.



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

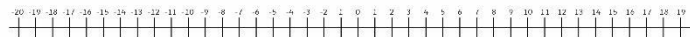
## Find a Path

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:

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



## 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.

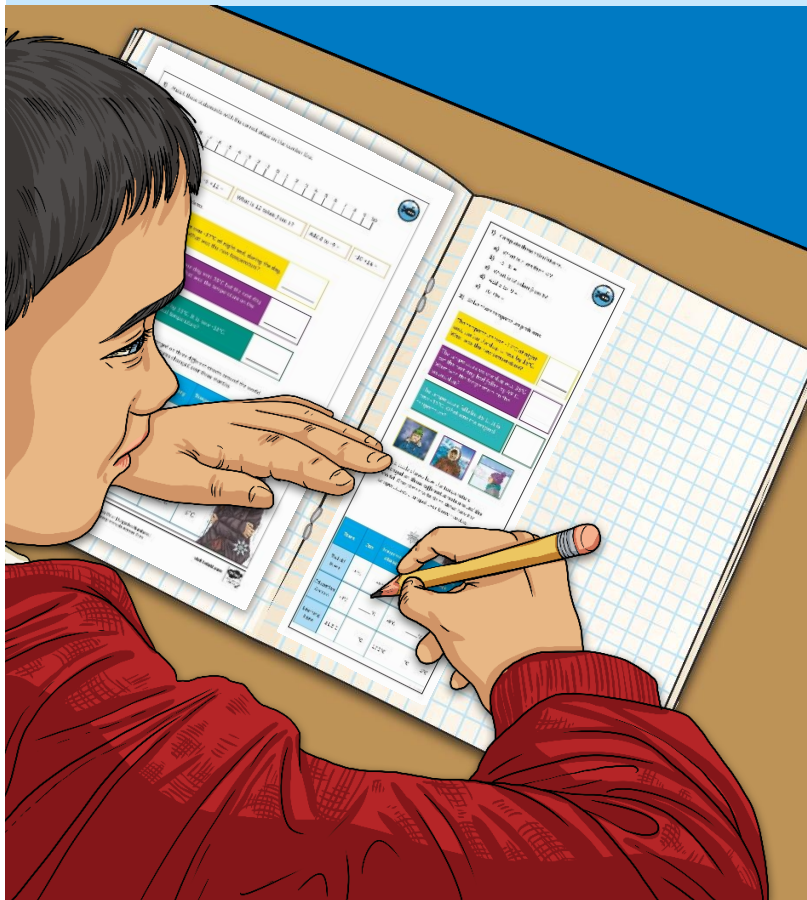
The first one has been done for you:

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



## Diving into Mastery

Dive in by completing your own activity!



1) Jai messes up the temperature in his world. Can you help him?

What was the temperature before he messes it up?

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

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

3) Solve these temperature problems.

a) The temperature was  $-17^{\circ}\text{C}$  at night and, during the day, it rose by  $12^{\circ}\text{C}$ . What was the new temperature? \_\_\_\_\_

b) The temperature on one day was  $35^{\circ}\text{C}$  but the next day had fallen by  $49^{\circ}\text{C}$ . What was the temperature on the second day? \_\_\_\_\_

c) The temperature falls by  $35^{\circ}\text{C}$ . It is now  $-18^{\circ}\text{C}$ . 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	$-5^{\circ}\text{C}$	$+8^{\circ}\text{C}$	_____	$-7^{\circ}\text{C}$	_____
Education Avenue	$-1^{\circ}\text{C}$	_____	$-9^{\circ}\text{C}$	_____	$1^{\circ}\text{C}$
Learning Lane	$-11.3^{\circ}\text{C}$	_____	$17.3^{\circ}\text{C}$	_____	$5^{\circ}\text{C}$

# Crossing Zero

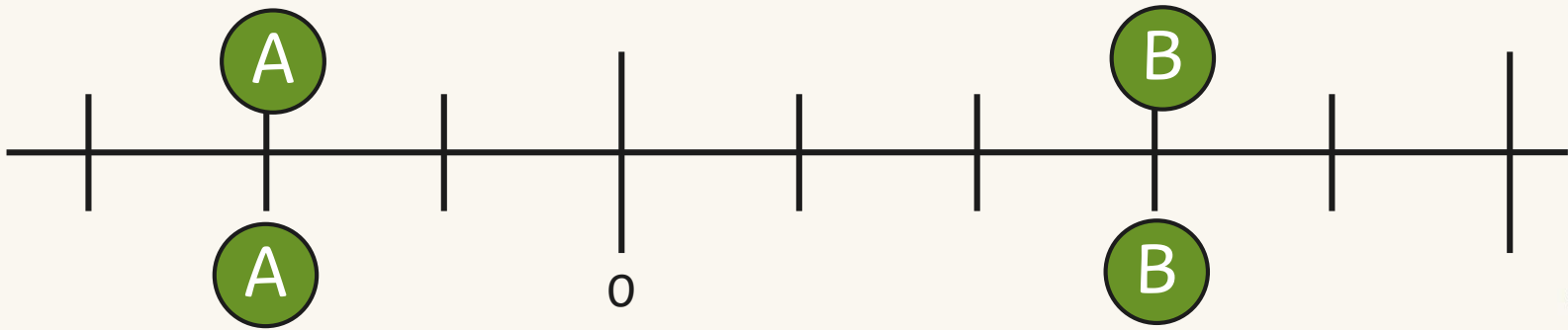


The difference between A and B is 100.  
Did you find the value of A and B?  
Can you find the value of A and B?

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  $100 \div 5$ , 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.



# 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.

765.395289873  
991 6789 78 096  
8 562 853 2234  
309 31 238 948  
9 5698 435 -31  
63 567 892 2.542

