Number and Place Value: Count Forwards and Backwards Through Zero

Aim:	**Success Criteria:**	**Resources:**
Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero. To count forwards and backwards through zero.	I can use a number line to count forwards and backwards through zero. I can use negative numbers when counting through zero.	Lesson Pack
	Key/New Words: Negative, below, zero, step, count, integer, digit, subtract.	**Preparation:** -20 to 20 Number Line – one per child/pair -50 to 50 Number Line – one per child/pair Race to Zero Cards – one per child/pair Diving into Mastery sheets – as required

Prior Learning: It will be helpful if children have been introduced to the concept of negative numbers. Click here to find lessons that seek to consolidate this step.

Learning Sequence

	**Remember It:** Using the numbers shown on the Lesson Presentation, match the powers of 10 to the correct answer in the table. Children find out which power of 10 does not match with an answer.	
	**Counting Forwards:** Show children the number lines on the Lesson Presentation and explain that they represent counting forwards. Can children identify the next number they would count on each number line?	
	**Counting Backwards:** Introduce the representations of counting backwards as shown on the Lesson Presentation. Can children identify the next number they would count on each number line?	
	**Counting Through Zero:** Discuss counting backwards and counting through zero, referring to the number line on the Lesson Presentation. Explain negative numbers and their function in counting. Children count back from 18 in steps of five. Can children identify the first negative number they would get to as they count through zero? Model counting backwards, clicking to show the process on the number line. Model how to read negative numbers - for example, -7 is read as 'negative seven' not 'minus seven'.	
	**Race to Zero:** Children play the game described on the Lesson Presentation. The aim of the game is to be the first player to hit zero exactly while counting backwards and forwards on their number line. Children take turns to draw a differentiated Race to Zero Card, and follow the counting instructions. Children record their steps on the Race to Zero Activity Sheet.  Use a -20 to 20 Number Line. Counting instructions go up to forwards or backwards 10.  Use a -50 to 50 Number Line. Counting instructions go up to forwards or backwards 25.  Children draw a simple table to record their steps.	
	**Diving into Mastery:** Schools using a mastery approach may prefer to use the following as an alternative activity. These sheets might not necessarily be used in a linear way. Some children might begin at the 'Deeper' section and in fact, others may 'dive straight in' to the 'Deepest' section if they have already mastered the skill and are applying this to show their depth of understanding.  Children identify missing positive and negative numbers on a number line. They then follow counting instructions.  Children respond to statements involving negative numbers, explaining their thinking with written responses.  Children complete problem-solving activities linked to negative numbers.	

	**Counting Challenge:** Children take turns to set counting challenges for each other by giving a starting number, counting direction and step or interval. Children could record their counting sequences in their books or on whiteboards. Use the -20 to 20 Number Line as required. Can children count forwards and backwards through zero?	

ExploreIt

CountIt: Use this Activity Sheet to consolidate children's understanding of counting forwards and backwards through zero.

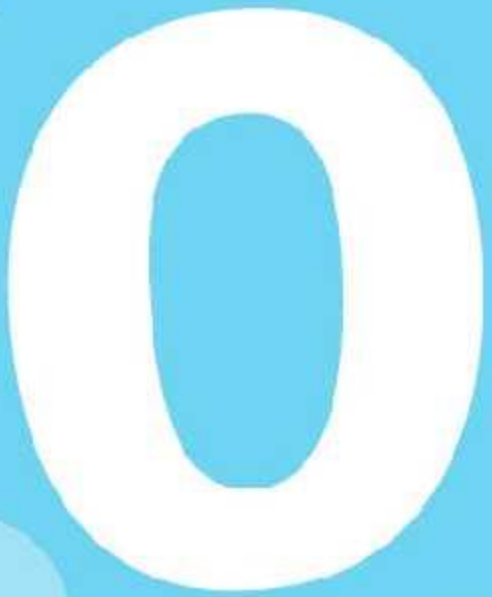
ResearchIt: Challenge children to find the average temperatures for different cities around the world. Can children count forwards and backwards through zero to find the difference between the temperatures of two places?

LearnIt: Children will find this visually exciting Knowledge Organiser a useful tool for understanding place value.

Maths

Number and Place Value

Count Forwards and Backwards Through Zero



Aim

- To count forwards and backwards through zero.

Success Criteria

- I can use a number line to count forwards and backwards through zero.
- I can use negative numbers when counting through zero.

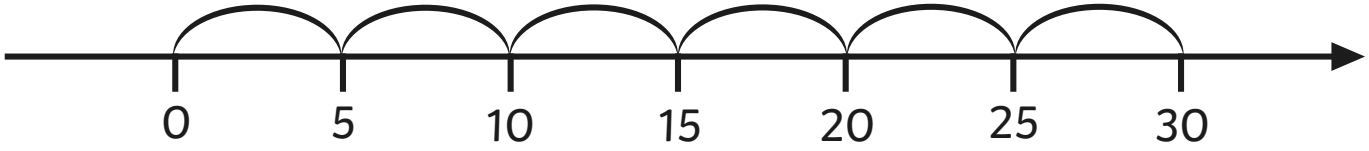
Remember It

Match the powers of 10 to the correct answers. Find the odd one out.

10^1	100
10^3	10 000
10^5	100 000
10^2	1 000
10^3	
10^4	

Counting Forwards

What would be the next number you would count on each line?



Counting Backwards

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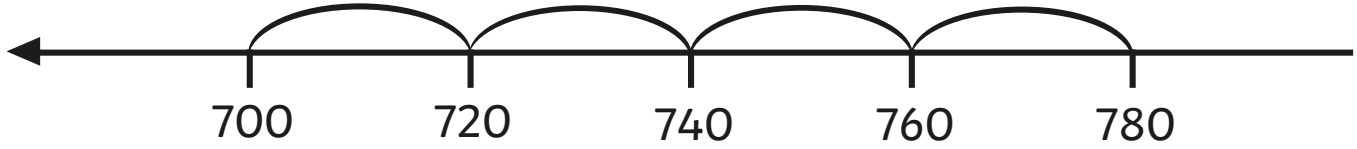
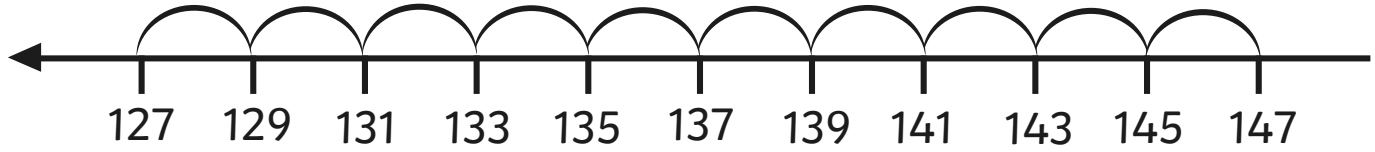
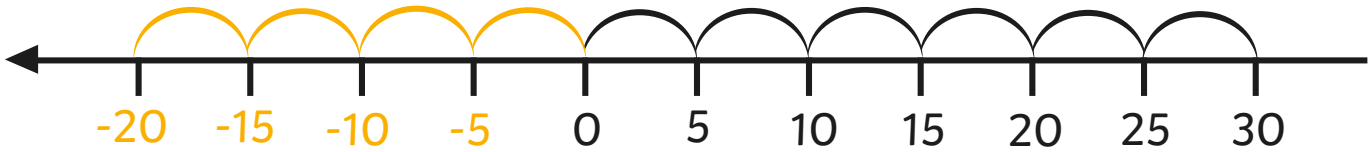




Counting Through Zero

What happens if we are counting backwards and we get to 0?



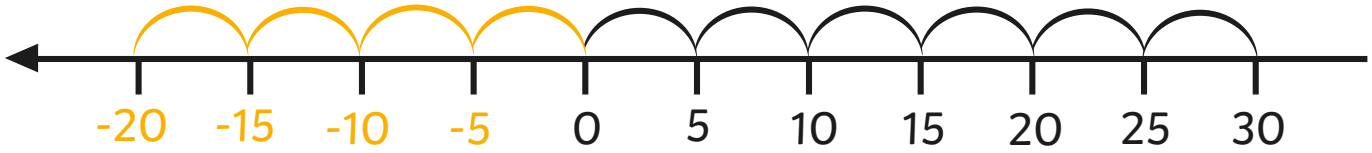
We can keep counting backwards using negative numbers.

Counting Through Zero

Negative numbers are numbers below 0.
They are expressed with a subtraction sign before the number, like this: -3

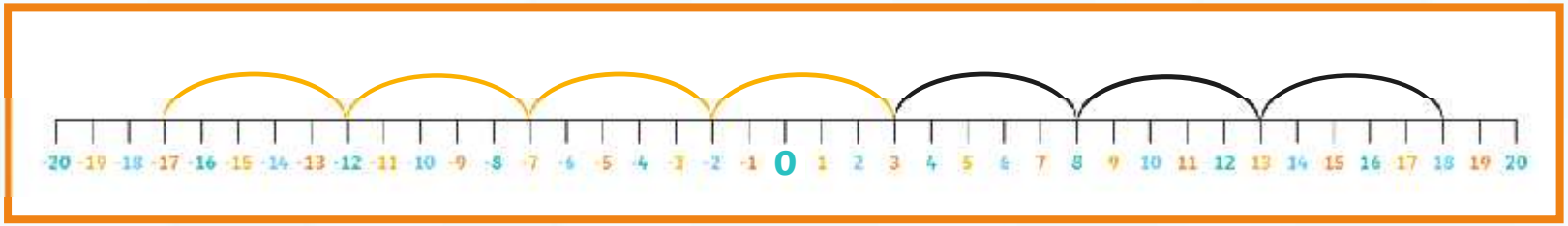
We can use negative numbers to describe values on scales that go below 0, such as temperature scales, or to express an absence or opposite of something.

Negative numbers are the opposite of positive numbers. Positive numbers increase above zero and negative numbers decrease below zero. As you move in steps further away from zero, the digits get bigger but in fact, the number is getting smaller.



Counting Through Zero

Let's try another one.



Start at 18, then count back to 13, 8 and then 3.

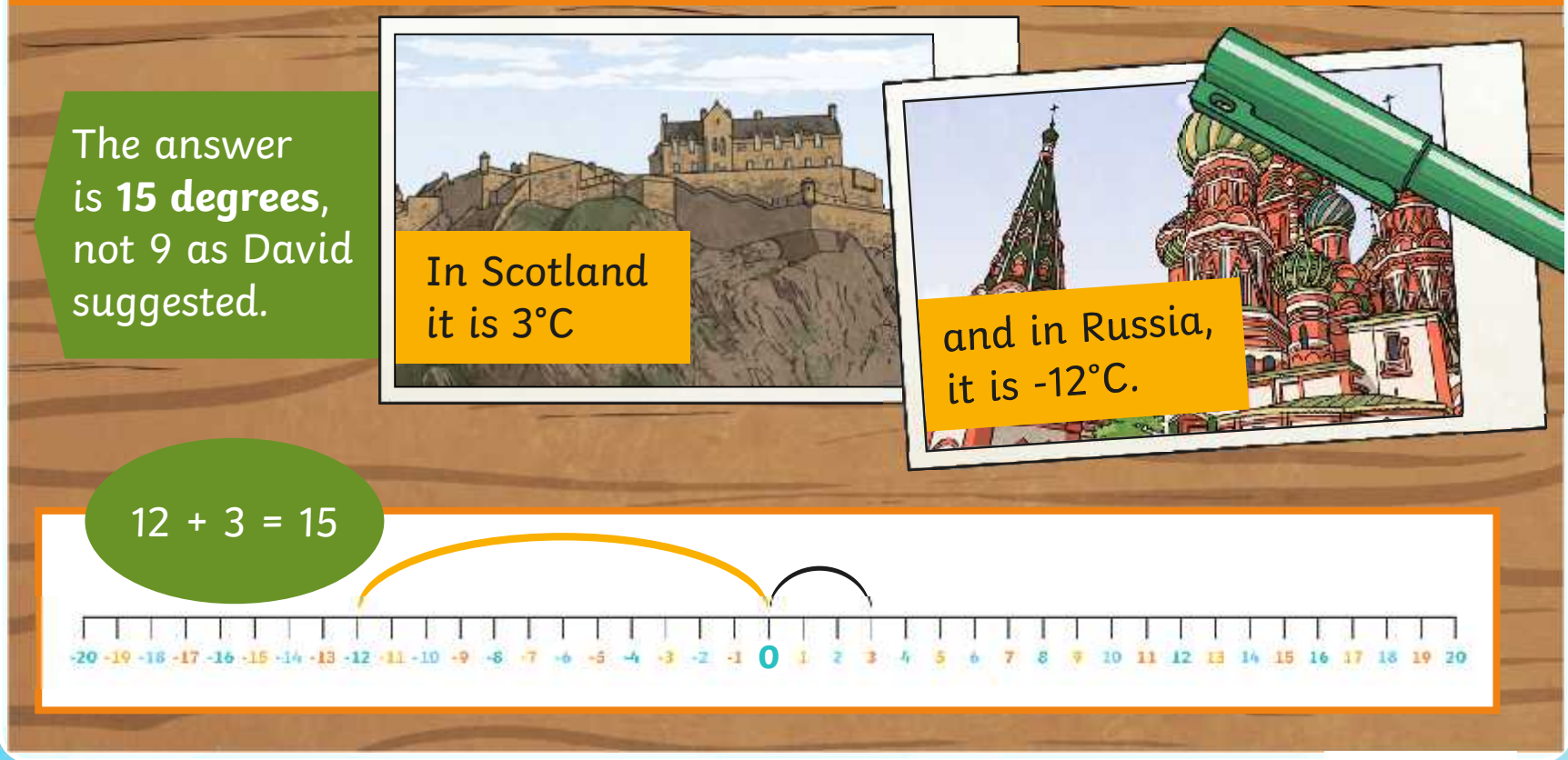
What are the first four negative numbers in the sequence?

Count through zero into the negative numbers, counting -2 first, then -7, -12 and -17.

Counting Through Zero

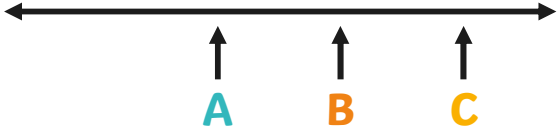
David says the difference between the two temperatures is 9°C.

Is David's statement true or false? Explain your answer fully.



Counting Through Zero

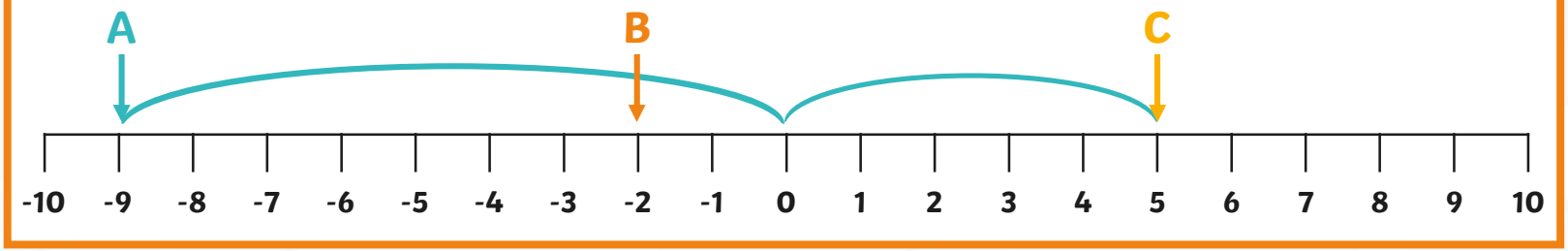
The arrows on the number line represent negative numbers.



A is 14 less than C.

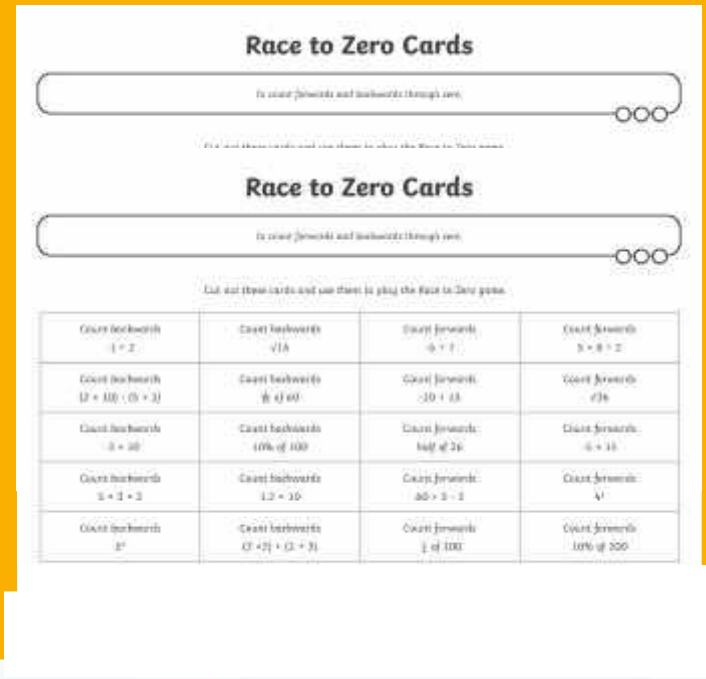
C is 5.

We know B is -2 because it is halfway between A and C.



Race to Zero

Play this game with a partner. You will need a **Negative Number Line**, a **Race to Zero Activity Sheet** and a set of **Race to Zero Cards**.



Race to Zero

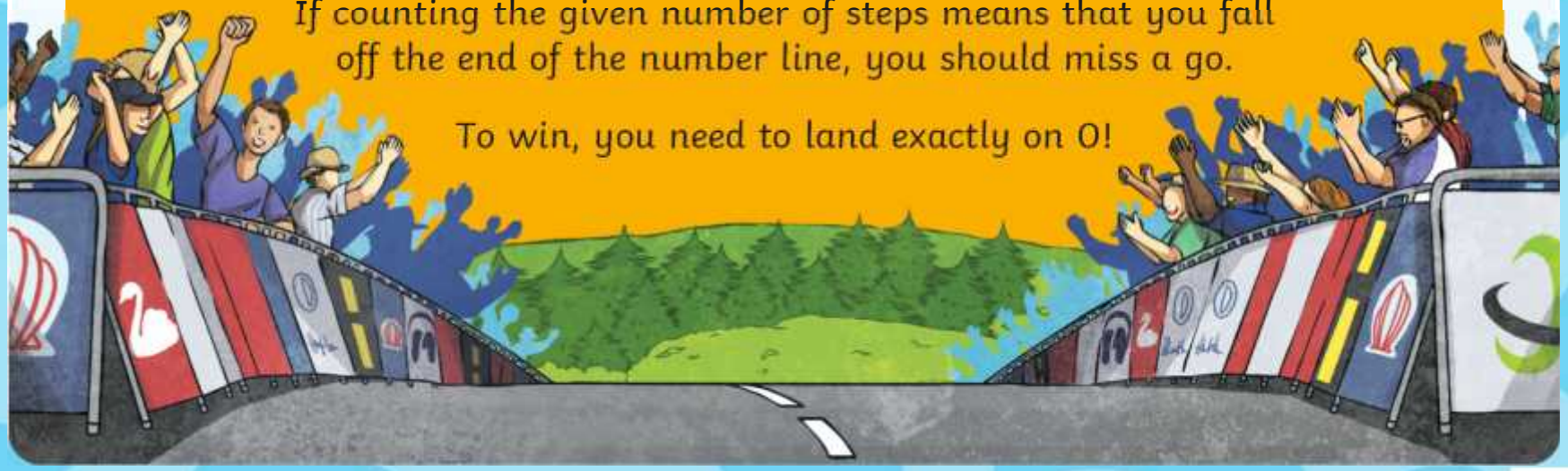
The aim of this game is to be the first player to hit 0 exactly. You will be counting forwards and backwards along the number line.

One player should start at one end of the number line, and the other player should start at the other end of the number line.

Take turns to draw a **Race to Zero Card**. Follow the instructions on the card, counting the given number of steps forwards or backwards.

If counting the given number of steps means that you fall off the end of the number line, you should miss a go.

To win, you need to land exactly on 0!



Race to Zero

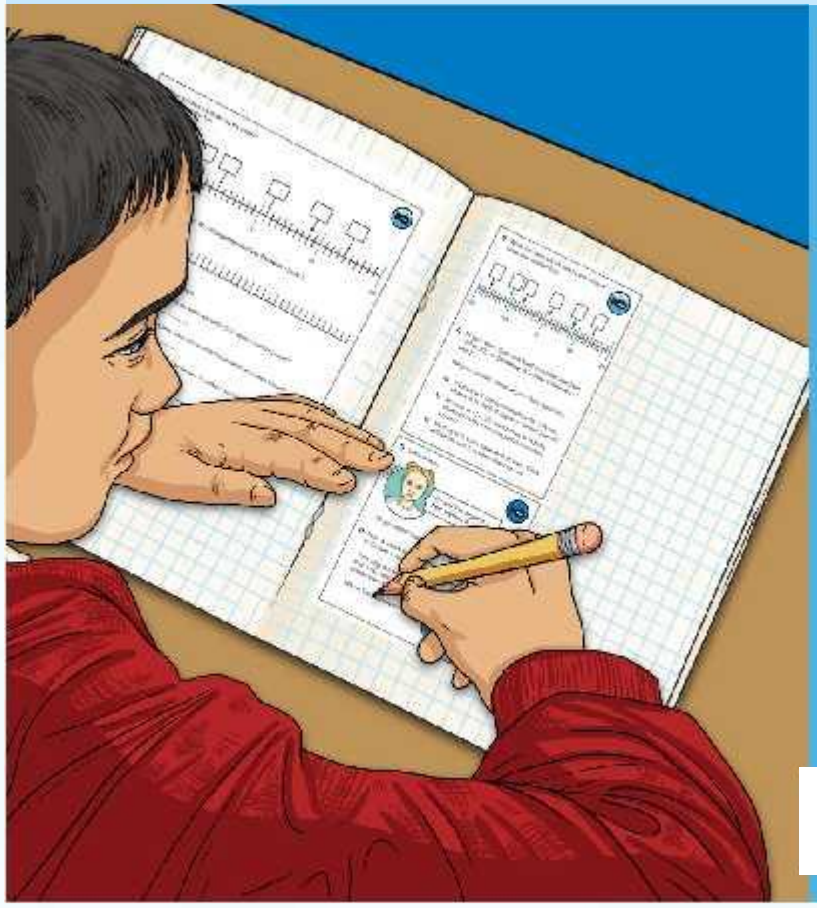
Keep a record of the steps you take to reach 0 in a table with two columns: Counting Instruction and New Number.

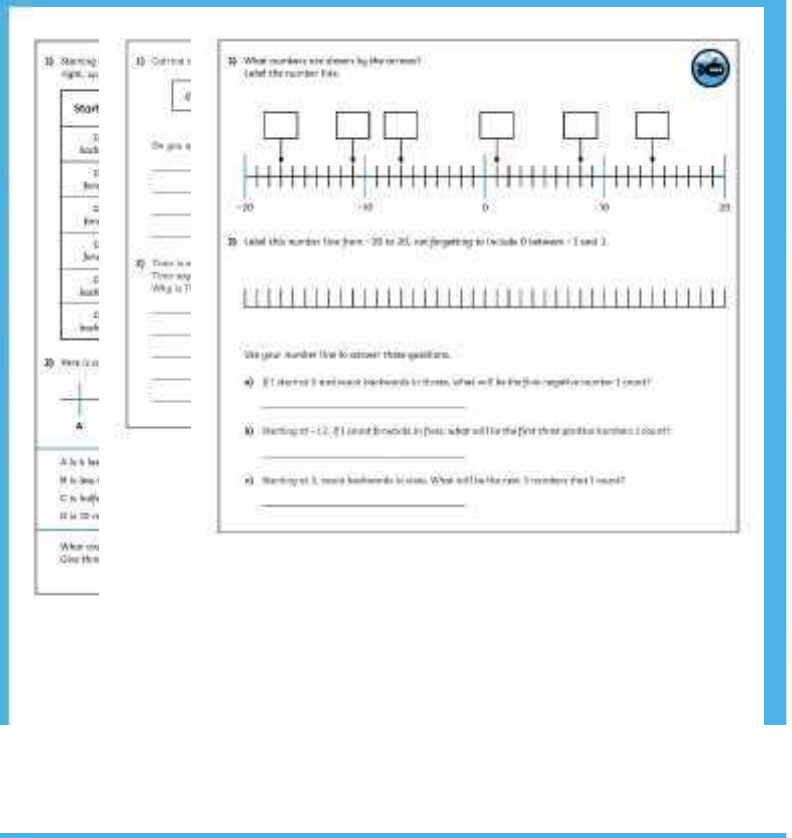
Counting instruction	New Number

Write down the counting instruction off the Race to Zero Card in the first column. Write the new number that you land on in the second column.

Diving into Mastery

Dive in by completing your own activity!





Counting Challenge

Use your **Negative Number Line** to set your partner a counting challenge!

Give them a starting number, a direction and a step.

For example, you might say, "Start at 13 and count backwards in fours."
Or you could say, "Start at -26 and count forwards in sevens."

Take turns to complete the counting challenges.

You may use the Negative Number Line to help you.

Aim

- To count forwards and backwards through zero.

Success Criteria

- I can use a number line to count forwards and backwards through zero.
- I can use negative numbers when counting through zero.

Aim: To count forwards and backwards through zero.				**Date:**					
				Delivered By:			**Support:**		
Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can use a number line to count forwards and backwards through zero.				**Notes/Evidence**					
I can use negative numbers when counting through zero.									

Next Steps

- _____
- _____

T	Teacher	**I**	Independent
PPA	Planning, Preparation and Assessment	**AL**	Adult Led
S	Supply	**GP**	Guided Practice

Aim: To count forwards and backwards through zero.				**Date:**					
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Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can use a number line to count forwards and backwards through zero.				**Notes/Evidence**					
I can use negative numbers when counting through zero.									

Next Steps

- _____
- _____

T	Teacher	**I**	Independent
PPA	Planning, Preparation and Assessment	**AL**	Adult Led
S	Supply	**GP**	Guided Practice

-20 to 20 Number Line

-20 to 20 Number Line

-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

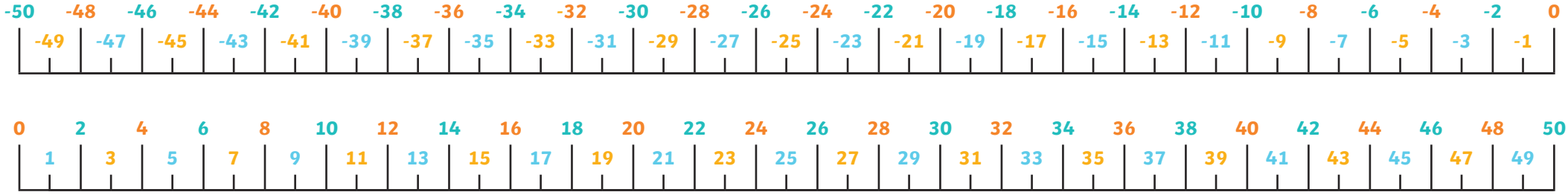
-20 to 20 Number Line

-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

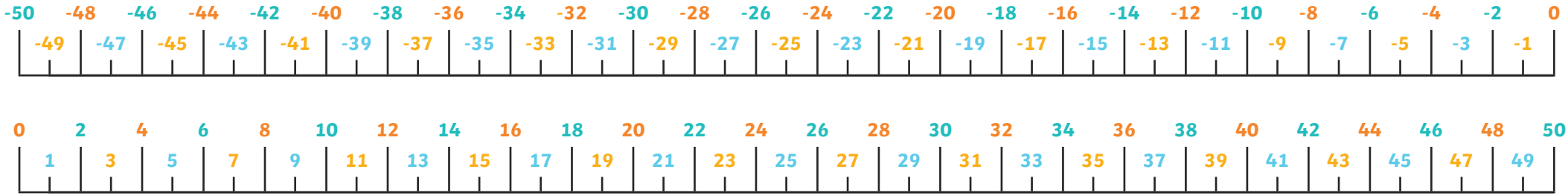
-20 to 20 Number Line

-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

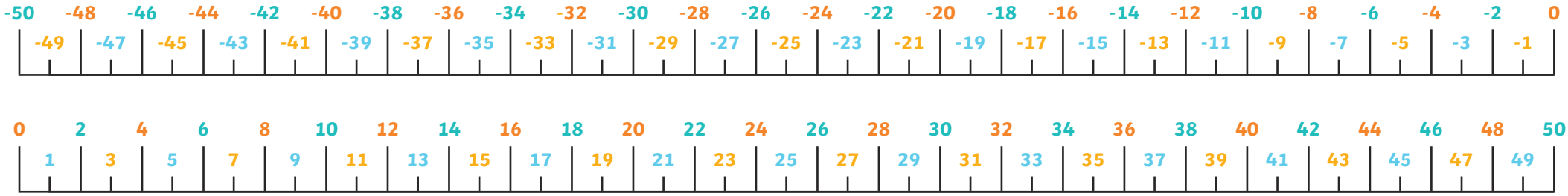
-50 to 50 Number Line



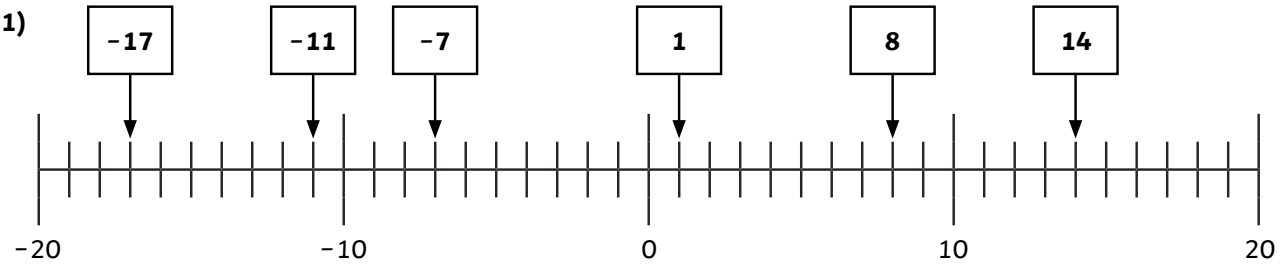
-50 to 50 Number Line



-50 to 50 Number Line



1)



2) a) −1

b) 3, 8, 13

c) −3, −9, −15

1) Catrina is wrong. If you add 5 to negative 3 you will have 2. Children might show this on a number line jotting.

2) Timo is incorrect because with negative numbers, as you move in steps further away from zero, the digits get bigger but in fact, the number is getting smaller.
−16 is further away from zero than −5 and is therefore colder in terms of temperature.

1) Here is one possible route through the maze.

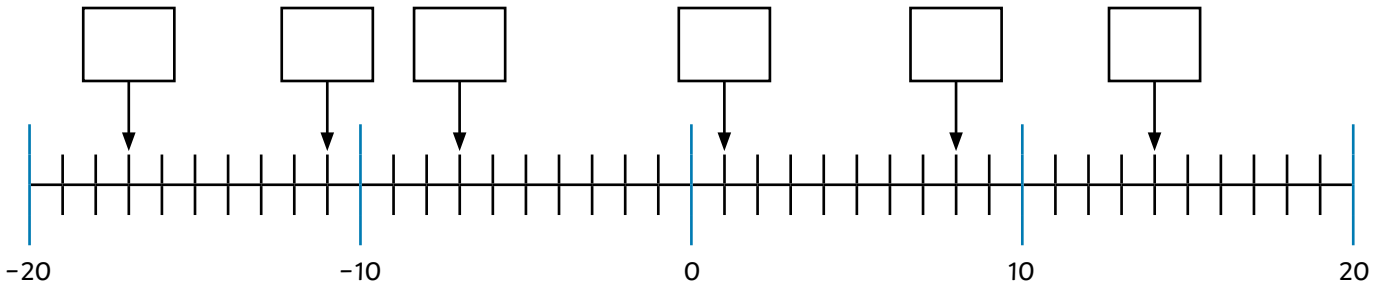
Start at −20	Count forwards 4	Count backwards 2	Count forwards 5
Count backwards 2	Count forwards 2	Count backwards 5	Count forwards 6
Count forwards 5	Count backwards 1	Count forwards 6	Count backwards 3
Count forwards 1	Count forwards 3	Count forwards 2	Count backwards 3
Count forwards 2	Count forwards 8	Count backwards 3	Count forwards 7
Count backwards 5	Count forwards 2	Count forwards 1	Count backwards 1
Count backwards 2	Count forward 5	**Finish 0**	Count forwards 7

2) Many answers possible, but should meet these criteria:

- B is negative
- B – 6 = A
- B + 5 = C
- B + 10 = D

A = **−8**	A = **−11**	A = **−16**
B = **−2**	B = **−5**	B = **−10**
C = **3**	C = **0**	C = **−5**
D = **8**	D = **5**	D = **0**

1) What numbers are shown by the arrows?
Label the number line.



2) Label this number line from −20 to 20, not forgetting to include 0 between −1 and 1.

Use the number line above to help you answer the following questions.

a) If I start at 5 and count backwards in threes, what will be the first negative number I count?

_____

b) Starting at −12, if I count forwards in fives, what will be the first three positive numbers I count?

_____

c) Starting at 3, count backwards in sixes. What will be the next 3 numbers that I count?

_____

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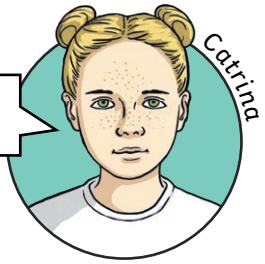
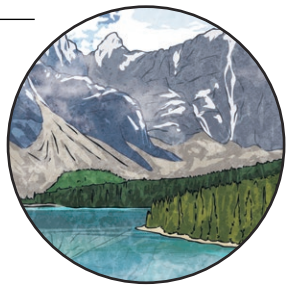


If I add 5 to negative 3, I get negative 8.

Do you agree? Explain your thinking.

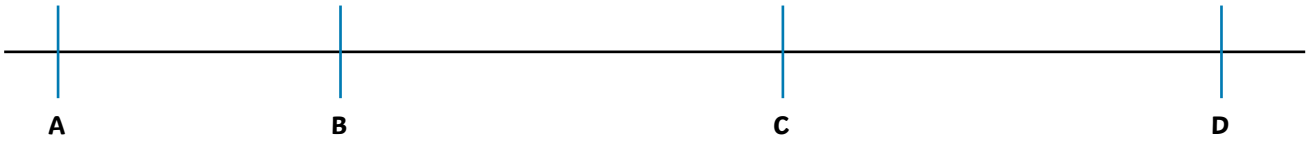
2) Timo is watching the weather forecast. In Canada, it is −5°C and in Norway, it is −16°C.
Timo says it is warmer in Norway than in Canada because 16 is greater than 5.
Why is Timo incorrect?



1) Starting with −20, can you find a route through the maze, moving only left, right, up or down to finish on exactly 0?

Start at −20	Count forwards 4	Count backwards 2	Count forwards 5
Count backwards 2	Count forwards 2	Count backwards 5	Count forwards 6
Count forwards 5	Count backwards 1	Count forwards 6	Count backwards 3
Count forwards 1	Count forwards 3	Count forwards 2	Count backwards 3
Count forwards 2	Count forwards 8	Count backwards 3	Count forwards 7
Count backwards 5	Count forwards 2	Count forwards 1	Count backwards 1
Count backwards 2	Count forward 5	**Finish 0**	Count forwards 7

2) Here is a number line.



A is 6 less than B.

B is less than 0.

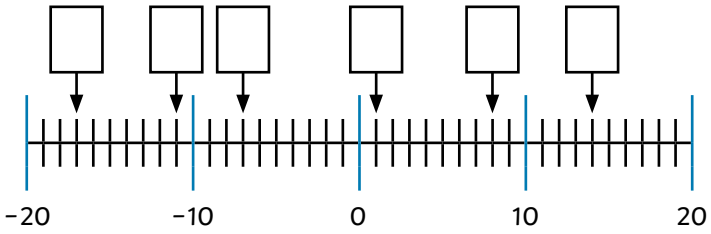
C is halfway between B and D.

D is 10 more than the value of B.

What could be the values of A, B, C and D?
Give three possible sets of numbers.

A =	A =	A =
B =	B =	B =
C =	C =	C =
D =	D =	D =

1) What numbers are shown by the arrows? Label the number line.



2) In your book, draw and label a number line from −20 to 20, not forgetting to include 0 between −1 and 1.

Use the number line you have drawn to help you answer the following questions.

a) If I start at 5 and count backwards in threes, what will be the first negative number I count?

b) Starting at −12, if I count forwards in fives, what will be the first three positive numbers I count?

c) Starting at 3, count backwards in sixes. What will be the next 3 numbers that I count?

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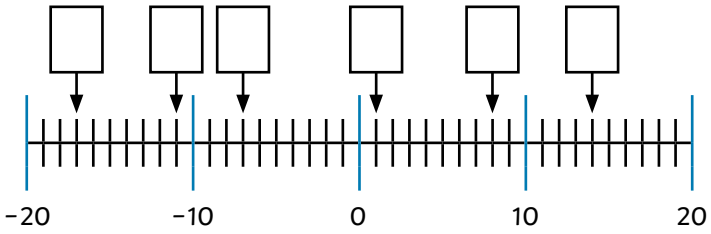

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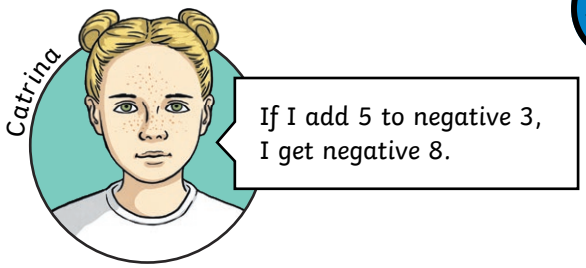

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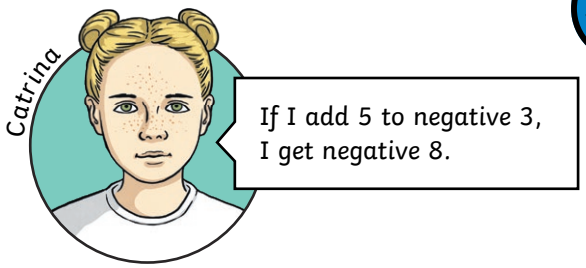

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Count forwards 1	Count forwards 3	Count forwards 2	Count backwards 3
Count forwards 2	Count forwards 8	Count backwards 3	Count forwards 7
Count backwards 5	Count forwards 2	Count forwards 1	Count backwards 1
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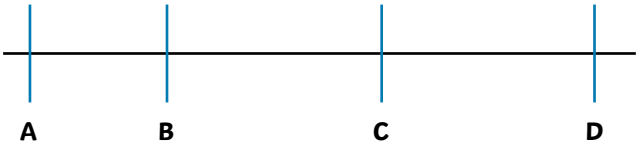

A is 6 less than B.

B is less than 0.

C is halfway between B and D.

D is 10 more than the value of B.

What could be the values of A, B, C and D?
Give three possible sets of numbers.

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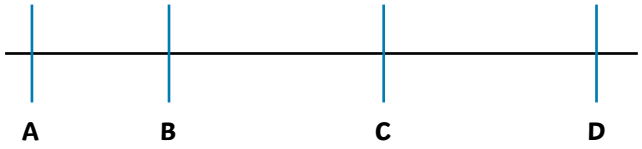

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What could be the values of A, B, C and D?
Give three possible sets of numbers.

Race to Zero Cards

To count forwards and backwards through zero.

Cut out these cards and use them to play the Race to Zero game.

Count backwards 1	Count backwards 2	Count forwards 1	Count forwards 2
Count backwards 3	Count backwards 4	Count forwards 3	Count forwards 4
Count backwards 5	Count backwards 6	Count forwards 5	Count forwards 6
Count backwards 7	Count backwards 8	Count forwards 7	Count forwards 8
Count backwards 9	Count backwards 10	Count forwards 9	Count forwards 10

Race to Zero Cards

To count forwards and backwards through zero.

Cut out these cards and use them to play the Race to Zero game.

Count backwards 1	Count backwards 4	Count forwards 1	Count forwards 2
Count backwards 5	Count backwards 8	Count forwards 5	Count forwards 6
Count backwards 7	Count backwards 10	Count forwards 13	Count forwards 10
Count backwards 15	Count backwards 12	Count forwards 17	Count forwards 16
Count backwards 25	Count backwards 20	Count forwards 25	Count forwards 20

Race to Zero Cards

To count forwards and backwards through zero.

Cut out these cards and use them to play the Race to Zero game.

Count backwards -1 + 2	Count backwards a quarter of 16	Count forwards -6 + 7	Count forwards 10 doubled
Count backwards a third of 15	Count backwards $\frac{1}{10}$ of 60	Count forwards -10 + 15	Count forwards $\frac{1}{6}$ of 36
Count backwards -3 + 10	Count backwards 10% of 100	Count forwards half of 26	Count forwards -5 + 15
Count backwards three lots of 10	Count backwards 1.2 × 10	Count forwards 15 + 2	Count forwards 8 doubled
Count backwards half of 50	Count backwards double 5	Count forwards $\frac{1}{4}$ of 100	Count forwards 10% of 200

Number and Place Value | Count Forwards and Backwards Through Zero

To count forwards and backwards through zero.		
I can use a number line to count forwards and backwards through zero.		
I can use negative numbers when counting through zero.		

Number and Place Value | Count Forwards and Backwards Through Zero

To count forwards and backwards through zero.		
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