# Worksheet - Negative numbers

Year: Year 4 · 21

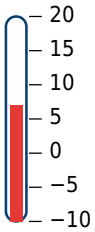
Show your working.

## Question 1

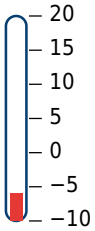
**Question 1 – Reading thermometers** *(Section A · Practice)*

Write the temperature shown on each thermometer. Say whether it is above or below freezing.

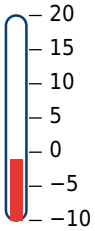
a.



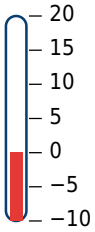

b.




c.




d.




## Question 2

**Question 2 – Ordering numbers** *(Section A · Practice)*

Write each set of numbers in order, smallest first.

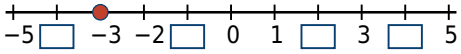
a. 4, −2, 0, −7, 5

b. −12, −3, 3, −1, 10
c. −20, −2, −200, −22

## Question 3

**Question 3 – Number line** *(Section A · Practice)*

Look at the number line. Write the numbers that go in the empty boxes. Then write the number shown by the red dot.




a. Fill in the four boxes.
b. What number does the red dot show?
c. Which number is 4 more than the red dot?

## Question 4

**Question 4 – Counting through zero** *(Section A · Practice)*

Count on or back to write the next three numbers in each sequence.

a. 5, 3, 1, −1, ...
b. −10, −7, −4, −1, ...
c. 8, 6, 4, 2, 0, ...
d. −4, −3, −2, ...

## Question 5

**Question 5 – Comparing with signs** *(Section A · Practice)*

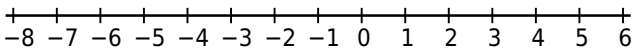
Write < or > in each box.

a. −3 [ ] 2
b. −8 [ ] −5
c. 0 [ ] −1
d. −15 [ ] −51
e. 4 [ ] −40

## Question 6

**Question 6 – Temperature differences** *(Section A · Practice)*

Find the difference between each pair of temperatures. Use a number line to help.



a. 3 °C and −4 °C
b. −2 °C and 5 °C
c. −6 °C and −1 °C
d. 0 °C and −7 °C

## Question 7

**Question 7 – Winter in the UK** *(Section B · Real-life practice)*

The table shows the lowest temperature, in degrees Celsius, in five UK towns on a cold January night.

| Town | Lowest temperature |
|---|---|
| Aberdeen | −6 °C |
| Belfast | −2 °C |
| Cardiff | 1 °C |
| Leeds | −4 °C |
| Plymouth | 3 °C |

a. Which town was the coldest?
b. Put the towns in order, coldest first.
c. What was the difference between the coldest and the warmest town?
d. In which towns was the temperature below freezing?

## Question 8

**Question 8 – Shopping centre lift** *(Section B · Real-life practice)*

The Westgate Shopping Centre has two car park floors below ground, a ground floor and four shop floors above ground. The lift buttons are numbered −2, −1, 0, 1, 2, 3 and 4.

a. Mia parks on floor −2 and goes up to floor 3. How many floors does the lift go up?
b. The cafe is on floor 2. Dev is on floor −1. How many floors up must he go to reach the cafe?
c. The lift starts at floor 4 and goes down 6 floors. At which floor does it stop?
d. Which floor is higher: −1 or −2? Explain.

## Question 9

**Question 9 – Freezers** *(Section B · Real-life practice)*

A shop has three freezers. Freezer A is at −18 °C, freezer B is at −24 °C and freezer C is at −15 °C. The ice cream needs a temperature of −16 °C or colder.

a. Which freezer is the coldest?
b. Which freezers are cold enough for the ice cream?

c. The power is cut and the temperature in freezer A rises by 6 degrees. What is the new temperature? Is it still cold enough for the ice cream?
d. How many degrees colder is freezer B than freezer C?

## Question 10

**Question 10 – Diving and mountains** *(Section B · Real-life practice)*

Sea level is 0 m. A scuba diver dives 12 metres below sea level. A mountain climber stands on a hill 8 metres above sea level. A submarine is at −35 m.

a. Write the height of the diver as a negative number.
b. How many metres is the climber above the diver?
c. The diver swims up 5 m. What is her new height?
d. How many metres is the submarine below the diver's starting position?

## Question 11

**Question 11 – Football goal difference** *(Section B · Real-life practice)*

Goal difference is the number of goals a team scores minus the number of goals it lets in. The table shows five teams after the first matches of the season.

| Team | Goals scored | Goals let in | Goal difference |
|---|---|---|---|
| Reds | 5 | 2 | ? |
| Blues | 2 | 5 | ? |
| Greens | 3 | 3 | ? |
| Yellows | 1 | 4 | ? |

a. Work out the goal difference for each team.
b. Put the teams in order of goal difference, highest first.
c. The Greens score 2 goals and let in 0 in the next match. What is their new goal difference?
d. How many goals is the Blues' goal difference below the Reds'?

## Question 12

**Question 12 – The board game** *(Section B · Real-life practice)*

Isla is playing a board game with squares numbered from −10 to 10. Her counter starts on square 0. A card tells her to move forward (to the right) or back (to the left).

a. Isla moves back 4, then back 3. Which square is she on?
b. Next she moves forward 9. Where does she land?
c. Her brother is on square −5. How many squares apart are they now?
d. The goal is square 10. How many squares does Isla need to move forward from her position to reach the goal?

## Question 13

**Question 13 – Ice and the temperature** *(Section B · Real-life practice)*

Water freezes at 0 °C. Archie puts a cup of water outside on a winter day. At noon the temperature is 5 °C. It falls by 2 degrees every hour.

| Time | Noon | 1 pm | 2 pm | 3 pm | 4 pm |
|---|---|---|---|---|---|
| Temperature (°C) | 5 | ? | ? | ? | ? |

a. Complete the table.
b. At what time does the water freeze?
c. What is the temperature at 5 pm?
d. By how many degrees has the temperature fallen from noon to 5 pm?

## Question 14

**Question 14 – Playing in the snow** *(Section B · Real-life practice)*

The temperature is −3 °C at 8 am when the children arrive at school. By break time it has risen by 4 degrees. At lunch it has risen by 2 more degrees. By home time it has fallen by 5 degrees from lunch time.

a. What is the temperature at break time?
b. What is the temperature at lunch time?
c. What is the temperature at home time?
d. At which time of day was it warmest and at which time of day was it coldest?

## Question 15

**Question 15 – Weather forecast** *(Section C · Problem solving)*

Here is a weather forecast for four days in a Scottish town. The table shows the highest and lowest temperatures.

| Day | Highest | Lowest |
|---|---|---|
| Monday | 2 °C | −5 °C |
| Tuesday | 0 °C | −7 °C |
| Wednesday | 5 °C | −1 °C |
| Thursday | −2 °C | −9 °C |

a. Which day had the lowest temperature of all? Which day had the highest?
b. Work out the difference between the highest and lowest temperature on each day.
c. Which day had the biggest difference?
d. The forecaster says, "Only one day was always below freezing." Is this correct? Which day?

e. Put the four lowest temperatures in order, coldest first.

## Question 16

**Question 16 – Antarctic research station** *(Section C · Problem solving)*

Scientists work at a research station in Antarctica. They record the temperature every 6 hours. The record on one day is shown in the table.

| Time | Temperature |
|---|---|
| 6 am | −22 °C |
| 12 noon | −15 °C |
| 6 pm | −19 °C |
| Midnight | −28 °C |

a. Write the temperatures in order, coldest first.
b. By how many degrees did the temperature rise between 6 am and noon?
c. By how many degrees did it fall between noon and midnight?
d. Find the difference between the warmest and the coldest temperatures that day.
e. The next day, the temperature at 6 am is 8 degrees warmer than at midnight. What is it?

## Question 17

**Question 17 – The mine lift** *(Section C · Problem solving)*

A lift in a salt mine goes from the surface down to the mine floor. The surface is level 0. The mine has levels at −50 m, −100 m and −150 m. A worker rides the lift and visits the levels in this order: surface, −100 m, −50 m, −150 m, surface.

a. How many metres does the lift go down from the surface to −100 m?
b. How many metres does it go up from −100 m to −50 m?
c. How many metres does it go down from −50 m to −150 m?
d. How many metres does the lift travel in total on the whole trip?
e. The lift moves at 5 metres each second. How many seconds does the first journey, from the surface to −100 m, take?

## Question 18

**Question 18 – Mountain climbing** *(Section C · Problem solving)*

As a climber goes higher up a mountain the temperature falls. At the foot of a mountain the temperature is 6 °C. For every 1 000 metres the climber goes up, the temperature falls by 6 degrees.

| Height above the foot | 0 m | 1 000 m | 2 000 m | 3 000 m | 4 000 m |
|---|---|---|---|---|---|
| Temperature | 6 °C | ? | ? | ? | ? |

a. Complete the table.
b. At what height is the temperature below freezing for the first time?
c. A flag at the top of the mountain is at 4 000 m. How far below zero is the temperature there?
d. A climber at 2 000 m puts on a coat if the temperature is below −3 °C. Does she need her coat? Explain.
e. The temperature at the top of another mountain, 5 000 m high, is how many degrees colder than the foot?

## Question 19

**Question 19 – Treasure map** *(Section C · Problem solving)*

A treasure map is drawn on a number line. Zero is the old oak tree. Positive numbers are paces to the east of the tree and negative numbers are paces to the west. These landmarks are on the map.

| Landmark | Position |
|---|---|
| Old oak tree | 0 |
| Stone bridge | −8 |
| Red barn | 5 |
| Duck pond | −3 |
| Windmill | 9 |

a. Which landmark is furthest west? Which is furthest east?
b. How many paces is it from the stone bridge to the windmill?
c. Pete starts at the duck pond and walks 6 paces east. Where does he stop? Which landmark is nearest?
d. The treasure is exactly half way between the stone bridge and the red barn. Between which two landmarks does it lie?

## Question 20

**Question 20 – Savings and owing** *(Section C · Problem solving)*

Tom has £5 in his pocket. His sister lends him money to buy a game. We write the amount of money Tom has as a number: £5 is 5 and owing £3 is −3. The table shows what happens each day.

| Day | What happens | Tom has |
|---|---|---|
| Monday | Starts with £5 | 5 |
| Tuesday | Spends £8 | ? |
| Wednesday | Gets £6 pocket money | ? |
| Thursday | Spends £4 | ? |

a. Complete the last column.
b. On which day does Tom owe his sister money?
c. How much money does Tom need to give his sister back on Tuesday?
d. On Friday Tom gets £10. How much does he have then? Is he still owing money?

## Question 21

**Question 21 – Challenge: temperature puzzle** *(Section D · Challenge)*

Four towns, A, B, C and D, have these temperatures in degrees Celsius: −6, −2, 1 and 4, but not in that order. Use the clues to match each town to its temperature.

- Town A is the coldest town.
- Town B is 3 degrees warmer than town D.
- Town C is warmer than town B.

a. Find the temperature of each town. Show how you used each clue.
b. The temperature of town C falls by 7 degrees overnight. What is it then? Is it still warmer than town D at its original temperature?
c. Check your answer to part (a): what is the difference between the warmest and the coldest town?