

Negative Numbers Challenge Cards **Answers**

1. **Multiple answers possible.**

2. Jiang writes the following statements:

- Negative nine is thirteen less than four. **True: $4 - 13 = -9$**
- $-23 + 17 = -40$ **False: $-23 + 17 = -6$. Adding 17 will increase the answer, taking it closer to the positive numbers.**
- 34 more than $-12 = 22$ **True: $-12 + 34 = 22$**
- The temperature inside is 15°C . Outside it is 22°C colder, so outside the temperature is 7°C . **False: Outside is -7°C . 22°C colder than 15°C will be less than 0°C , so the temperature will be negative.**

Giving reasons, explain whether each statement is true or false.

3. Lily writes the following calculations:

$$14 - 25 = -11$$

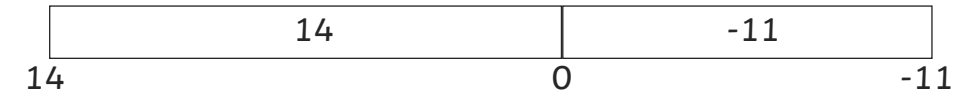
$$-4 + 17 = 13$$

Write an explanation, including visual methods, showing how to calculate the answers to these problems.

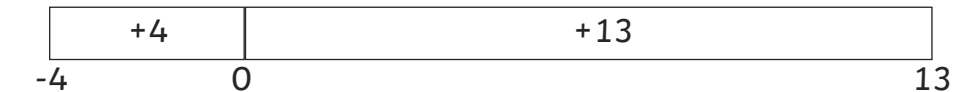
Compare your explanations with a partner. Can you make any improvements?

Accept correct explanations, such as:

-25 can be split into -14 to 0 and -11 beyond 0 to -11 .



$+17$ can be split into $+4$ to 0 and $+13$ to 13.



4. Adam writes the calculation: $-5 + 18 = 13$

He writes a real-life example with money to illustrate the calculation.

"I owe my dad $\pounds 5$. I sell a computer game to a friend for $\pounds 18$. After I pay back my dad, I have $\pounds 13$ left."

He writes another calculation: $16 - 19 = -3$

Write a real-life example with money to illustrate the calculation. Share with a partner and make any improvements.

Accept any correct real-life world problem involving money, for example 'I have $\pounds 16$. I want to buy a shirt for $\pounds 19$, so I borrow $\pounds 3$ from my mother. I now have a debt of $\pounds 3$ '.

Negative Numbers Challenge Cards **Answers**

5. Jiang has two thermometers. He places one in a bowl of ice with some salt and he keeps the other on the table. Here are the readings on the thermometers:

Write two calculations with explanations to show the difference in temperature between the salted ice and the room.

Accept correct calculations and explanations. For example, $-11 + 34 = 23$. The temperature in the classroom is 34°C warmer than the temperature of the salted ice.

$23 - -11 = 34$. The difference between the temperature in the room and in the salted ice is 34°C .

Write your own scenario with two thermometers, where both temperatures are negative, and explain with calculations.

Accept any correct response, such as 'Two thermometers are placed outside on a freezing cold day. One is close to the school, and the other in the middle of the playground. The thermometer close to the school measures -2°C . The thermometer in the playground measures -6°C .'

6. Lily writes the following linear sequences: -13, -9, -3, 1, 5, 9, 13

The step is +4, so Lily has added 6 to -9 to get -3, when it should be -5.

16, 9, 2, -3, -10, -17

The step is -7, so Lily has made a mistake crossing 0 and only subtracted 5 from 2 to get to -3, when 7 should be subtracted to get to -5.

29, 18, 7, -6, -15, -24

Can you spot and explain the errors that Lily has made?

The step is -11. Lily has mistakenly continued the pattern of the ones digit decreasing by 1 each step, but when the step crosses 0, the ones digits should start increasing by 1.

7. Adam says, "When you count backwards in tens from a positive number through zero, the ones digit will always stay the same."

Explain why Adam is incorrect, but when he might be correct.

Compare your answers with a partner and make any improvements to your own explanation.

Accept a correct explanation with an example. For example, counting back from 14: 14, 4, -6, -16. The ones digit changes. This will be true for any sequence beginning with a number ending in 1, 2, 3, 4, 6, 7, 8, 9.

However, when you count backwards in tens from a number ending in 0 or 5, the ones digit will always be 0 or 5 respectively: 15, 5, -5, -15 or 20, 10, 0, -10, -20.

Negative Numbers Challenge Cards



Negative Numbers

1.

Lily and Adam work together. They are counting in steps forwards and backwards, including negative numbers.

Lily gives Adam the starting number of 12 and tells him to count in steps of -5.

Adam counts: 12, 7, 2, -3, -8, -13, -18, -23, -28, -33

Can you repeat this challenge with a partner? Give them a starting number and a sequence of steps to follow. Remember that you can choose whether to go forwards or backwards and your start number could be negative or positive.

Negative Numbers

2.

Jiang writes the following statements:

- Negative nine is thirteen less than four.
- $-23 + 17 = -40$
- 34 more than $-12 = 22$
- The temperature inside is 15°C . Outside it is 22°C colder, so outside the temperature is 7°C .

Giving reasons, explain whether each statement is true or false.



Negative Numbers

3.

Lily writes the following calculations:

$$14 - 25 =$$

$$-4 + 17 =$$

Write an explanation, including visual methods, showing how to calculate the answers to these problems.

Compare your explanations with a partner.

Can you make any improvements?



Negative Numbers

4.

Adam writes the calculation: $-5 + 18 = 13$

He writes a real-life example with money to illustrate the calculation.

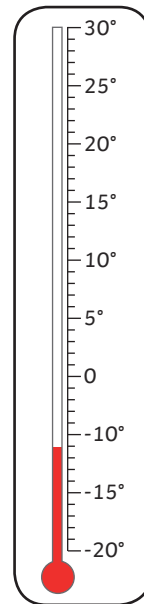
“I owe my dad £5. I sell a computer game to a friend for £18. After I pay back my dad, I have £13 left.”

He writes another calculation: $16 - 19 = -3$

Write a real-life example with money to illustrate the calculation. Share with a partner and make any improvements.

Negative Numbers

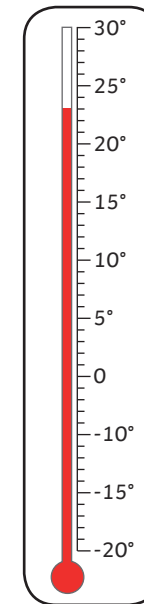
5.



Jiang has two thermometers. He places one in a bowl of ice with some salt and he keeps the other on the table.

Write two calculations with explanations to show the difference in temperature between the salted ice and the room.

Write your own scenario with two thermometers, where both temperatures are negative, and explain with calculations.



Negative Numbers

6.

Lily writes the following linear sequences:

-13, -9, -3, 1, 5, 9, 13

16, 9, 2, -3, -10, -17

29, 18, 7, -6, -15, -24



Can you spot and explain the errors that Lily has made?

Write some incorrect sequences for a partner to check.

Negative Numbers

7.

Adam says, “When you count backwards in tens from a positive number through zero, the ones digit will always stay the same.”

Explain why Adam is incorrect, but when he might be correct.

Compare your answers with a partner and make any improvements to your own explanation.

