

Signs Tell Stories

Use integers to show positions, changes, and reference points.

GRADE 6 • NY-6.NS.5

NY-6.NS.5 "Understand that positive and negative numbers are used together to describe quantities having opposite directions or values. Use positive and negative numbers to represent quantities in real-world contexts..."

NAME _____

DATE _____

THE BIG IDEA

Positive and negative numbers show values on opposite sides of a reference point. A positive sign can mean above, ahead, or a gain, while a negative sign can mean below, behind, or a loss. The number 0 names the reference point, so it is neither positive nor negative.

WORKED EXAMPLE

A hot-air balloon is 14 meters above a field marker. Write a signed number for its position relative to the marker.

1. The field marker is the reference point.
2. Above the marker has a positive value.
3. Write +14.

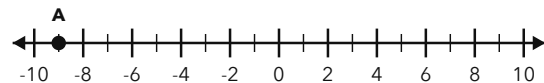
Answer: +14 meters

PRACTICE 6 problems

- 1** At noon, the temperature is 7° below 0° . Write the integer for the temperature. What does 0° mean in this situation?

ANSWER _____

- 2** On the number line, 0 represents sea level. Point A represents a diver's position relative to sea level. Write the integer at A. Explain what 0 means.



ANSWER _____

- 3** A game shows -11 coins next to Lee's name. This means Lee owes 11 coins. Write the signed number that would mean Lee has 11 coins instead.

ANSWER _____

- 4** A theater lobby is floor 0. The balcony is 6 floors above the lobby. Write the balcony's location.

ANSWER _____

- 5** A submarine's depth is represented by -18 m. What does this tell you? What does 0 m mean in this situation?

ANSWER _____

- 6** In a soccer standings chart, a goal difference of +4 means a team scored 4 more goals than it allowed. What does a goal difference of 0 mean?

ANSWER _____

APPLY IT Show your work

- 1** At a robotics tournament, the score display uses 0 for a team's starting score. After a round, Nia's team is 23 points above its starting score, and Omar's team is 16 points below its starting score. Write each team's score display. Explain what 0 means.

WORK SPACE

ANSWER _____

- 2** An indoor climbing wall has a center line marked 0 cm. One hold is 12 cm above the center line, and another hold is 19 cm below it. Write each hold's signed location. Which location is greater? Explain what 0 cm means.

WORK SPACE

ANSWER _____

CHALLENGE One step up

On a hiking trail, the trailhead is 0 m. A lookout is at +25 m, and a creek is at -25 m. Are the lookout and creek at the same elevation? Explain your reasoning. What does 0 m represent?

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	At noon, the temperature is 7° below 0° . Write the integer for the temperature. What does 0° mean in this situation?	-7; 0° is the reference temperature.
2	On the number line, 0 represents sea level. Point A represents a diver's position relative to sea level. Write the integer at A. Explain what 0 means.	-9; 0 is sea level.
3	A game shows -11 coins next to Lee's name. This means Lee owes 11 coins. Write the signed number that would mean Lee has 11 coins instead.	$+11$
4	A theater lobby is floor 0. The balcony is 6 floors above the lobby. Write the balcony's location.	$+6$
5	A submarine's depth is represented by -18 m. What does this tell you? What does 0 m mean in this situation?	The submarine is 18 m below sea level; 0 m is sea level.
6	In a soccer standings chart, a goal difference of $+4$ means a team scored 4 more goals than it allowed. What does a goal difference of 0 mean?	The team scored the same number of goals as it allowed.

PART 2 • APPLY IT

- $+23$ for Nia's team and -16 for Omar's team; 0 means the score is the same as the starting score.** Above the starting score is positive, and below the starting score is negative. The starting score is the reference point.
- $+12$ cm and -19 cm; $+12$ cm is greater; 0 cm is the center line on the wall.** Positions above the center line are positive, and positions below it are negative. Any positive integer is greater than any negative integer.

CHALLENGE

No. They are each 25 m from the trailhead, but the lookout is above it and the creek is below it, so they have opposite elevations. 0 m represents the trailhead.

Accept positive integers with or without a plus sign when the context clearly shows a positive value. Accept equivalent wording for the meaning of 0, as long as the student identifies the correct reference point.