NWEA Assessment Item Illustrating 7.NS.A
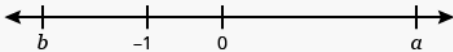
Domain: The Number System

7.NS.A Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Calculator Availability: No

Use the number line to complete the task.

Select <u>all</u> the expressions that have a negative value.

- ☐ A. $-a$
- ☐ B. $-b$
- ☐ C. $1 - a$
- ☐ D. $b - a$
- ☐ E. $-b + 1$

Alignment: 7.NS.A.1: Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
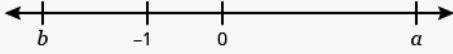
Understanding the meaning of operations with rational numbers is an important part of grade 7 work. The use of variables to represent values in this item were chosen to illustrate the grade-level expectation for further developing the meaning of operations with rational numbers and the magnitudes of the results. The expressions in this item are crafted so that students can leverage their knowledge of structure and the rules for operating with rational numbers to decide on the positioning without executing any specific computations.

Coherence: Students began work with the horizontal number line in grade 2, using it as a tool to order whole numbers, and extend that knowledge in grades 4 and 5 to order fractions[4.NF.A] and decimals.[5.NBT.A.3] In grade 6, students learned that there is a number system that includes both positive and negative numbers, and that the distance from zero is a measure of magnitude, known as absolute value.[6.NS.A] This knowledge is foundational for the continued work in grade 7 in the rational number system including representation and operations with rational numbers.[7.NS.A] Computation with rational numbers supports the work across domains,[7.EE.A/B] and prepares students for work with computing with scientific notation,[8.EE.4] and understanding the work with irrational numbers.[8.NS.A]

Rigor: This item attends to conceptual understanding. Students are asked to use their understanding of operations with negative rational numbers to determine the resulting magnitude without computing. Variables are used so that students must engage in reasoning as they relate concepts of positioning on a number line and rules for operating with negative numbers, without using a procedure.

Answer Key:

Use the number line to complete the task.

b ... -1 ... 0 ... a

Select <u>all</u> the expressions that have a negative value.

- ☑ A. $-a$
- ☐ B. $-b$
- ☑ C. $1-a$
- ☑ D. $b-a$
- ☐ E. $-b+1$

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