

Subtract and Measure

Use opposites and absolute value to find differences and distances.

GRADE 7 • 7.NR.1.4

7.NR.1.4 "Show and explain subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in..."

NAME _____

DATE _____

SUBTRACT WITH OPPOSITES

To subtract a rational number, add its additive inverse: $p - q = p + (-q)$. Distance on a number line is $|p - q|$, so it is nonnegative. Equal locations have distance 0.



WORKED EXAMPLE

Use the number line. Find the distance between P and Q.

1. Distance = $|5 - (-4)|$.
2. Rewrite subtraction as addition: $|5 + 4|$.
3. $|9| = 9$.

Answer: 9 units

PRACTICE 6 problems

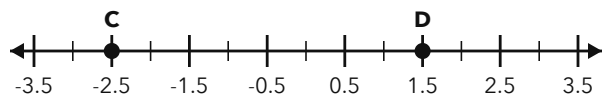
- 1** Rewrite the subtraction as addition, then find the value: $-7/8 - 3/8$.

ANSWER _____

- 2** Rewrite the subtraction as addition, then find the value: $7/6 - (-5/12)$.

ANSWER _____

- 3** Use the number line. Find the distance between C and D. Show a subtraction expression with absolute value.

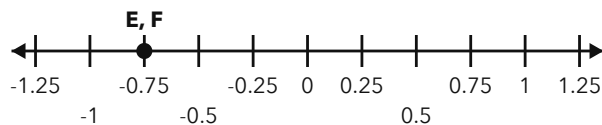


ANSWER _____

- 4** Rewrite the subtraction as addition, then find the value: $-5/4 - 8/3$.

ANSWER _____

- 5** Points E and F coincide at $-3/4$, as shown. What is the distance between them? Explain.



ANSWER _____

- 6** Rewrite the subtraction as addition, then find the value: $11/10 - 8/5$.

ANSWER _____

APPLY IT Show your work

- 1** A video game tournament tracker shows Jalen at $-9/4$ points and Mira at $7/5$ points. How far apart are their scores on the tracker?

ANSWER _____

- 2** In a diving game, a player's avatar is at $-7/6$ meters and a hidden treasure is at $-11/3$ meters. How far must the avatar move vertically to reach the treasure?

ANSWER _____

CHALLENGE One step up

Find the distance between $13/8$ and $-5/3$. Show subtraction as adding the additive inverse. Then explain why your answer is nonnegative.

PRACTICE 1

$$-7/8 - 3/8 = -7/8 + (-3/8) = -10/8 = -5/4.$$

PRACTICE 2

$$7/6 - (-5/12) = 7/6 + 5/12 = 14/12 + 5/12 = 19/12.$$

PRACTICE 3

$$|-2.5 - 1.5| = 4$$

PRACTICE 4

$$-5/4 - 8/3 = -5/4 + (-8/3) = -15/12 - 32/12 = -47/12.$$

PRACTICE 5

$$|-3/4 - (-3/4)| = |-3/4 + 3/4| = 0. \text{ Coincident points have distance 0.}$$

PRACTICE 6

$$11/10 - 8/5 = 11/10 + (-8/5) = 11/10 - 16/10 = -1/2.$$

APPLY IT 1

73/20 points

Find the absolute value of their difference: $|-9/4 - 7/5| = |-45/20 - 28/20| = 73/20$.

APPLY IT 2

5/2 meters

Use the distance formula: $|-7/6 - (-11/3)| = |-7/6 + 22/6| = 15/6 = 5/2$.

CHALLENGE

$13/8 - (-5/3) = 13/8 + 5/3 = 79/24$. The absolute value of the difference is $79/24$, and absolute value is nonnegative.

Accept equivalent values; distances must be nonnegative.