

Moves Make Sums

Use distance and direction to add rational numbers.

GRADE 7 • 7.NR.1.2

7.NR.1.2 "Show and explain $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction, depending on whether q is positive or negative. Interpret sums of rational numbers by describing applicable situations."

NAME _____

DATE _____

START, MOVE, LAND

To find $p + q$, start at p . Move $|q|$ units right when q is positive, or move $|q|$ units left when q is negative. The number where you land is the sum.

WORKED EXAMPLE

Find $-4.2 + 1.7$ by using distance and direction.

1. Start at -4.2 .
2. Since 1.7 is positive, move right.
3. $|1.7| = 1.7$, so move 1.7 units.
4. Land at -2.5 .

Answer: $-4.2 + 1.7 = -2.5$

PRACTICE 6 problems

- 1** For $p = -3$ and $q = 8$, state the distance and direction from p . Then find $p + q$.

ANSWER _____

- 2** For $p = 6$ and $q = -9$, state the distance and direction from p . Then find $p + q$.

ANSWER _____

- 3** For $p = -5/8$ and $q = -3/4$, state the distance and direction from p . Then find $p + q$.

ANSWER _____

- 4** For $p = 2/3$ and $q = -7/6$, state the distance and direction from p . Then find $p + q$.

ANSWER _____

- 5** For $p = -1.5$ and $q = 2.25$, state the distance and direction from p . Then find $p + q$.

ANSWER _____

- 6** For $p = 4$ and $q = -5/2$, state the distance and direction from p . Then find $p + q$.

ANSWER _____

APPLY IT Show your work

- In an online tournament, Jada's score is -12 points. She earns 17 bonus points in the next round.
- 1** Write a sum to model the change. What is her new score, and which direction does she move on a number line?

WORK SPACE

ANSWER _____

- A scuba diver begins at $-1\frac{1}{2}$ meters relative to sea level. Then the diver descends $2\frac{1}{4}$ meters.
- 2** Write a sum to model the situation and find the diver's final position. Explain why the starting position and the descent are both negative numbers.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Without converting to decimals, find $-7/9 + 5/6$. Explain the distance and direction of the move, then explain why the final location is positive.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	For $p = -3$ and $q = 8$, state the distance and direction from p . Then find $p + q$.	Move 8 units right; $p + q = 5$.
2	For $p = 6$ and $q = -9$, state the distance and direction from p . Then find $p + q$.	Move 9 units left; $p + q = -3$.
3	For $p = -5/8$ and $q = -3/4$, state the distance and direction from p . Then find $p + q$.	Move $3/4$ unit left; $p + q = -11/8$, or $-1\frac{3}{8}$.
4	For $p = 2/3$ and $q = -7/6$, state the distance and direction from p . Then find $p + q$.	Move $7/6$ units left; $p + q = -1/2$.
5	For $p = -1.5$ and $q = 2.25$, state the distance and direction from p . Then find $p + q$.	Move 2.25 units right; $p + q = 0.75$.
6	For $p = 4$ and $q = -5/2$, state the distance and direction from p . Then find $p + q$.	Move $5/2$ units left; $p + q = 3/2$, or $1\frac{1}{2}$.

PART 2 • APPLY IT

- $-12 + 17 = 5$. Jada moves 17 units right and has 5 points.** Start at -12 . Earning 17 points is a positive change, so move 17 units right to land at 5.
- $-1\frac{1}{2} + (-2\frac{1}{4}) = -3\frac{3}{4}$ meters. The starting position is negative because it is below sea level, and the descent is negative because downward movement is the negative direction.** The initial position is negative because the diver is below sea level. The descent is also negative because downward movement is the negative direction, so add $-2\frac{1}{4}$ to $-1\frac{1}{2}$.

CHALLENGE

Move $5/6$ unit right from $-7/9$. Since $5/6 = 15/18$ and $7/9 = 14/18$, the move passes 0 by $1/18$, so $-7/9 + 5/6 = 1/18$.

Accept equivalent fractions and mixed-number forms. For direction statements, accept right or positive direction, and left or negative direction.