

1/7

Lesson 2: Changing Elevation

Let's solve problems about adding signed numbers.

2.1: That's the Opposite

1. Draw arrows on a number line to represent these situations:
 - a. The temperature was -5 degrees. Then the temperature rose 5 degrees.



- b. A climber was 30 feet above sea level. Then she descended 30 feet.



2. What's the opposite?
 - a. Running 150 feet east.
 - b. Jumping down 10 steps.
 - c. Pouring 8 gallons into a fish tank.

150 W

UP 10

Emptying 8 gallons

★ opposites of each other always equal zero
 $-30 + 30 = 0$
 $100 - 100 = 0$

2.2: Cliffs and Caves

m.openup.org/1/7-5-3-2



1. A mountaineer is climbing on a cliff. She is 400 feet above the ground. If she climbs up, this will be a positive change. If she climbs down, this will be a negative change.

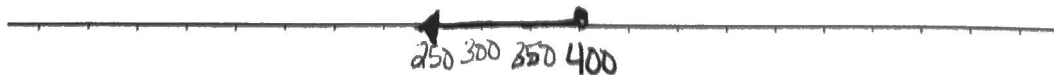
- a. Complete the table.

	starting elevation (feet)	change (feet)	final elevation (feet)
A	+400	300 up	+700
B	+400	150 down	+250
C	+400	400 down	0
D	+400	350 down	+50

$400 + 300$
 $400 - 150$
 $400 - 400$
 $400 - 350$

- b. Write an addition equation and draw a number line diagram for B. Include the starting elevation, change, and final elevation in your diagram.

$$400 + (-150) = 250$$



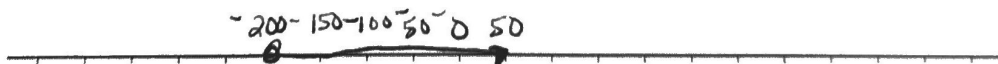
2. A spelunker is down in a cave next to the cliff. If she climbs down deeper into the cave, this will be a negative change. If she climbs up, whether inside the cave or out of the cave and up the cliff, this will be a positive change.

a. Complete the table.

	starting elevation (feet)	change (feet)	final elevation (feet)
A	-200	150 down	-350
B	-200	100 up	-100
C	-200	200 up	0
D	-200	250 up	+50
E	-200	300 down	-500

- b. Write an addition equation and draw a number line diagram for C and D. Include the starting elevation, change, and final elevation in your diagram.

$$-200 + 200 = 0$$



- c. What does the expression $-75 + 100$ tell us about the spelunker? What does the value of the expression tell us?

2.3: Adding Rational Numbers

Find the sums.

1. $-35 + (30 + 5)$

$$\begin{array}{r} -35 + 35 \\ \hline 0 \end{array}$$

2. $-0.15 + (-0.85) + 12.5$

$$\begin{array}{r} -1.0 + 12.5 \\ \hline 11.5 \end{array}$$

3. $\frac{1}{2} + (-\frac{3}{4})$

$$\begin{array}{r} \frac{3}{4} \\ -\frac{1}{2} \\ \hline \frac{2}{4} \end{array} \quad \begin{array}{r} \frac{3}{4} \\ -\frac{1}{4} \\ \hline \frac{2}{4} \end{array} \quad \begin{array}{r} \frac{1}{4} \\ -\frac{1}{4} \\ \hline 0 \end{array}$$

Are you ready for more?

Find the sum without a calculator.

$$10 + 21 + 32 + 43 + 54 + (-54) + (-43) + (-32) + (-21) + (-10)$$