Name _____   Date_____

Addition and Subtraction of Rational Numbers

At the beginning of the summer, the water level of a pond is 2 feet below its normal level. After an unusually dry summer, the water level of the pond dropped another $1\frac{1}{3}$ feet.

1. Use a number line diagram to model the pond's current water level in relation to its normal water level.

2. Write an equation to show how far above or below the normal water level the pond is at the end of the summer.
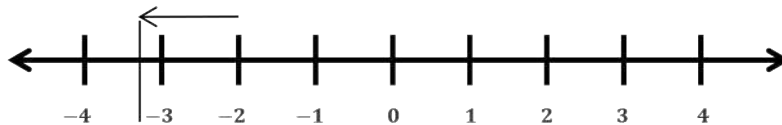
Represent each of the following problems using both a number line diagram and an equation.

1. A bird that was perched atop a $15\frac{1}{2}$-foot tree dives down six feet to a branch below. How far above the ground is the bird's new location?

2. Mariah had owed her grandfather $2.25 but was recently able to pay him back $1.50. How much does Mariah currently owe her grandfather?

3. Jake is hiking a trail that leads to the top of a canyon. The trail is 4.2 miles long, and Jake plans to stop for lunch after he completes 1.6 miles. How far from the top of the canyon will Jake be when he stops for lunch?

4. Sonji and her friend Rachel are competing in a running race. When Sonji is 0.4 miles from the finish line, she notices that her friend Rachel has fallen. If Sonji runs one tenth of a mile back to help her friend, how far will she be from the finish line?

5. Mr. Henderson did not realize his checking account had a balance of $200 when he used his debit card for a $317.25 purchase. What is his checking account balance after the purchase?

6. If the temperature is $-3°F$ at $10\!:\!00$ p.m., and the temperature falls four degrees overnight, what is the resulting temperature?

At the beginning of the summer, the water level of a pond is 2 feet below its normal level. After an unusually dry summer, the water level of the pond dropped another $1\frac{1}{3}$ feet.

1. Use a number line diagram to model the pond's current water level in relation to its normal water level.

Move $1\frac{1}{3}$ units to the left of -2. $-3\frac{1}{3}$

2. Write an equation to show how far above or below the normal water level the pond is at the end of the summer.
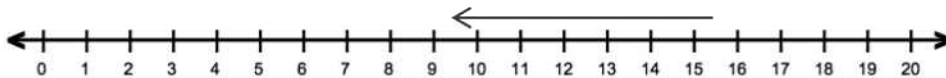
$$-2 - 1\frac{1}{3} = -3\frac{1}{3} \ \text{ or } \ -2 + \left(-1\frac{1}{3}\right) = -3\frac{1}{3}$$

Represent each of the following problems using both a number line diagram and an equation.

1. A bird that was perched atop a $15\frac{1}{2}$-foot tree dives down six feet to a branch below. How far above the ground is the bird's new location?

$$15\frac{1}{2} + (-6) = 9\frac{1}{2} \ or \ 15\frac{1}{2} - 6 = 9\frac{1}{2}$$

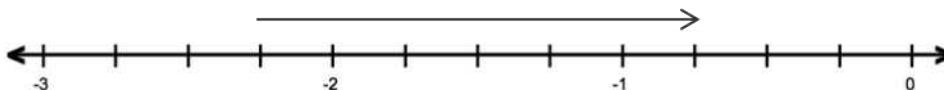*The bird is $9\frac{1}{2}$ feet above the ground.*

2. Mariah had owed her grandfather $\$2.25$ but was recently able to pay him back $\$1.50$. How much does Mariah currently owe her grandfather?
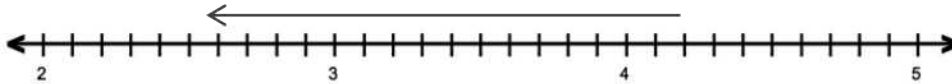
$$-2.25 + 1.50 = -0.75$$

Mariah owes her grandfather 75 cents.

3. Jake is hiking a trail that leads to the top of a canyon. The trail is 4.2 miles long, and Jake plans to stop for lunch after he completes 1.6 miles. How far from the top of the canyon will Jake be when he stops for lunch?
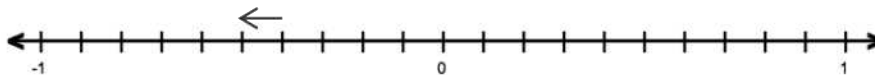
$$4.2 - 1.6 = 2.6$$

Jake will be 2.6 miles from the top of the canyon.

4. Sonji and her friend Rachel are competing in a running race. When Sonji is 0.4 miles from the finish line, she notices that her friend Rachel has fallen. If Sonji runs one tenth of a mile back to help her friend, how far will she be from the finish line?

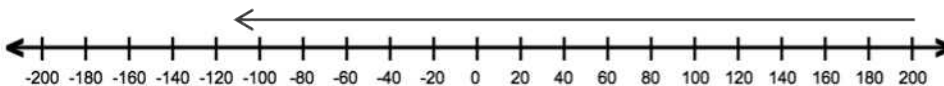$$-0.4 + (-0.1) = -0.5 \ \ or \ \ -0.4 - 0.1 = -0.5$$

Sonji will be 0.5 miles from the finish line.

5. Mr. Henderson did not realize his checking account had a balance of $\$200$ when he used his debit card for a $\$317.25$ purchase. What is his checking account balance after the purchase?

$$200 + (-317.25) = -117.25 \ \ or \ \ 200 - 317.25 = -117.25$$

Mr. Henderson's checking account balance will be $-\$117.25$.

6. If the temperature is $-3°F$ at $10{:}00$ p.m. and the temperature falls four degrees overnight, what is the resulting temperature?

$$-3 - 4 = -3 + (-4) = -7$$

The resulting temperature is $-7°F$.