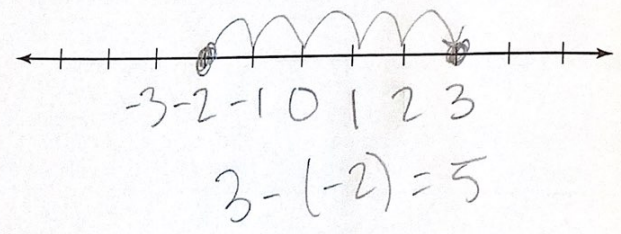


## Exploration 2 Finding Distances on a Number Line

Work with a partner.

- a. Find the distance between 3 and -2 on a number line.

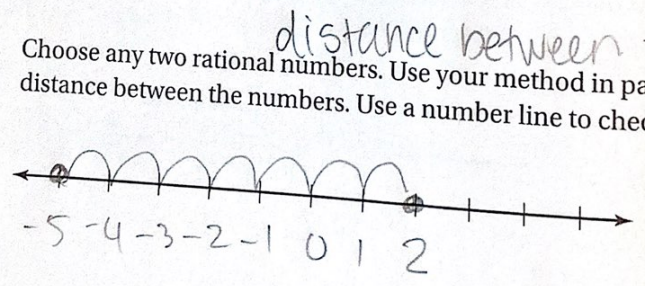


- b. The distance between 3 and 0 is the absolute value of 3, because  $|3 - 0| = |3| = 3$ . How can you use absolute values to find the distance between 3 and -2? Justify your answer.



- c. Choose any two rational numbers. Use your method in part (b) to find the distance between the numbers. Use a number line to check your answer.

*\* distance is always positive!*



*distance between -5 and -2*

$$-5 - (-2) = |-7| = 7$$

### 3 MTR ADAPT A PROCEDURE

How can you find the distance between any two rational numbers on a number line?

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**Try It**

Find the difference.

Bell Ringer a/1

1.  $10 - 15$

2.  $-7 - (-5)$

3.  $5 - (-18)$

4.  $-2.1 - 3.9$

$-6$

5.  $-8.8 - (-8.8)$

0

6.  $0.45 - (-0.05)$

0.5

**Example 2 Subtracting Rational Numbers**

Find  $-4\frac{1}{7} - \frac{5}{7}$ .

**Estimate**  $-4 - 1 = -5$

Rewrite the difference as a sum by adding the opposite.

$$-4\frac{1}{7} - \frac{5}{7} = -4\frac{1}{7} + \left(-\frac{5}{7}\right)$$

Because the signs are the same, add  $\left|-4\frac{1}{7}\right|$  and  $\left|-\frac{5}{7}\right|$ .

$$\begin{aligned} \left|-4\frac{1}{7}\right| + \left|-\frac{5}{7}\right| &= 4\frac{1}{7} + \frac{5}{7} \\ &= 4 + \frac{1}{7} + \frac{5}{7} \\ &= 4 + \frac{6}{7} \text{ or } 4\frac{6}{7} \end{aligned}$$

Find the absolute values.

Write  $4\frac{1}{7}$  as  $4 + \frac{1}{7}$ .

Add fractions and simplify.

Because  $-4\frac{1}{7}$  and  $-\frac{5}{7}$  are both negative, use a negative sign in the difference.

► So,  $-4\frac{1}{7} - \frac{5}{7} = -4\frac{6}{7}$ .

**Reasonable?**  $-4\frac{6}{7} \approx -5$  ✓



**Try It**

Find the difference. Write your answer in simplest form.

7.  $\frac{1}{3} - \left(-\frac{1}{3}\right)$

$\frac{2}{3}$

8.  $-3\frac{1}{3} - \frac{2}{3}$

$-4$

9.  $4 - 5\frac{1}{2}$

$-1\frac{1}{2}$

**Example 3 Using Properties of Addition**

Evaluate  $-1\frac{3}{8} - 8\frac{1}{2} - \left(-6\frac{7}{8}\right)$ .

Use properties of addition to group the mixed numbers that include fractions with the same denominator.

$$-1\frac{3}{8} - 8\frac{1}{2} - \left(-6\frac{7}{8}\right) = -1\frac{3}{8} + \left(-8\frac{1}{2}\right) + 6\frac{7}{8} \quad \text{Rewrite as a sum of terms.}$$

$$= -1\frac{3}{8} + 6\frac{7}{8} + \left(-8\frac{1}{2}\right) \quad \text{Comm. Prop. of Add.}$$

$$= 5\frac{1}{2} + \left(-8\frac{1}{2}\right) \quad \text{Add } -1\frac{3}{8} \text{ and } 6\frac{7}{8}.$$

$$= -3 \quad \text{Add } 5\frac{1}{2} \text{ and } -8\frac{1}{2}.$$

**Try It**

Evaluate the expression. Write fractions in simplest form.

10.  $-2 - \frac{2}{5} + 1\frac{3}{5}$

$-\frac{4}{5}$

11.  $7.8 - 3.3 - (-1.2) + 4.3$

$10$

go to pg 88

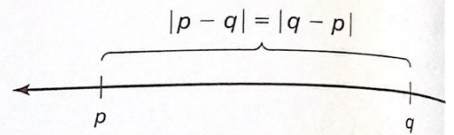


## Key Idea

### Distance between Numbers on a Number Line

**Words** The distance between any two numbers on a number line is the absolute value of the difference of the numbers.

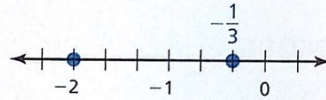
**Model**



### Example 4 Finding Distance on a Number Line

Find the distance between  $-\frac{1}{3}$  and  $-2$  on a number line.

To find the distance, find the absolute value of the difference of the numbers.



$$\left| -2 - \left(-\frac{1}{3}\right) \right| = \left| -2 + \frac{1}{3} \right| \quad \text{Add the opposite of } -\frac{1}{3}.$$

$$= \left| -1\frac{2}{3} \right| \quad \text{Add } -2 \text{ and } \frac{1}{3}.$$

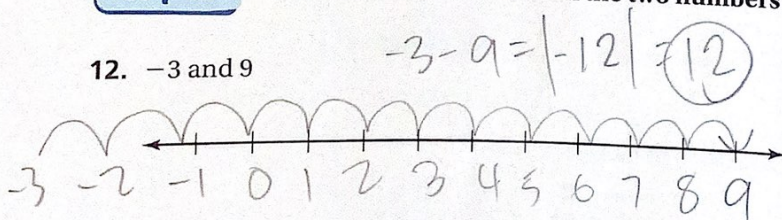
$$= 1\frac{2}{3} \quad \text{Find the absolute value.}$$

► So, the distance between  $-\frac{1}{3}$  and  $-2$  is  $1\frac{2}{3}$ .

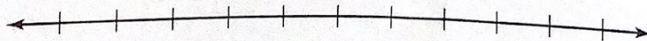
### Try It

Find the distance between the two numbers on a number line.

12.  $-3$  and  $9$



13.  $-7.5$  and  $-15.3$



$$-7.5 - (-15.3)$$
$$7.8$$

14.  $1\frac{1}{2}$  and  $-\frac{2}{3}$



$$2\frac{1}{6}$$