

# 5 Rational Numbers

## Key Words

denominator  
fraction  
numerator  
rational number

A **rational number** is any number that can be expressed as  $\frac{a}{b}$ , where  $a$  and  $b$  are integers and  $b \neq 0$ . Rational numbers include integers, fractions, repeating decimals, and terminating decimals. A **fraction** is a number that names equal parts in a whole. In a fraction, the **numerator** represents the number of equal parts being used. The **denominator** represents the total equal parts of the whole. Rational numbers can be negative or positive.

$-6$  is rational because it can be expressed as a fraction:  $-\frac{6}{1}$ .

$0.678$  is rational because it can be expressed as a fraction:  $\frac{678}{1000}$ .

$1.\bar{3}$  is rational because it can be expressed as a fraction:  $\frac{4}{3}$ .

$\pi$  is *not* rational because it *cannot* be expressed as a fraction.

## Example

Plot  $-1\frac{1}{4}$  and  $1.\bar{1}$  on the number line below.

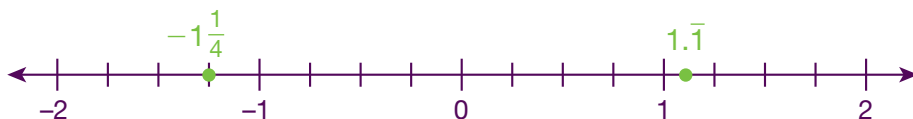


There are 4 spaces between each pair of integers on the number line. So, each mark represents  $\frac{1}{4}$ .

The rational number  $-1\frac{1}{4}$  is negative and is  $\frac{1}{4}$  less than  $-1$ . So it should be plotted one mark to the left of  $-1$ .

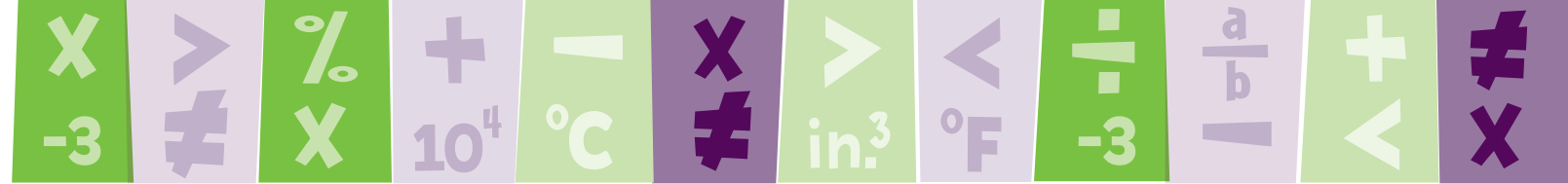
The rational number  $1.\bar{1}$  is positive and is  $0.\bar{1}$  greater than 1. So it should be plotted to the right of 1. Since each mark represents  $\frac{1}{4}$  or 0.25, plot  $1.\bar{1}$  about halfway to the left of the first mark after 1.

The number line below shows  $-1\frac{1}{4}$  and  $1.\bar{1}$ .



## SKETCH

Create a number line to plot  $-3.\bar{7}$ .



## Guided Practice

- 1 Plot  $-1\frac{2}{5}$  on the number line below.



**Step 1** Determine the value of each space on the number line.

There are \_\_\_\_\_ spaces between each pair of integers.

So, each space represents \_\_\_\_\_.

**Step 2** Determine where to plot the point.

The sign for  $-1\frac{2}{5}$  is \_\_\_\_\_ and  $-1\frac{2}{5}$  is \_\_\_\_\_ less than  $-1$ .

Therefore, the point should be plotted \_\_\_\_\_ marks to the left of  $-1$ .

### REMEMBER

On a number line, negative numbers are to the left of 0. Positive numbers are to the right of 0.

**Step 3** Plot the point on the number line.

The number  $-1\frac{2}{5}$  lies on a mark on the number line. Plot it on the number line.

- 2 A baker uses  $0.\bar{3}$  ounces of salt in a recipe. Plot the number of ounces of salt she uses on the number line below.



**Step 1** Determine the value of each space on the number line.

There are \_\_\_\_\_ spaces between each pair of integers.

So, each space represents \_\_\_\_\_.

**Step 2** Determine where to plot the point.

The sign for  $0.\bar{3}$  is \_\_\_\_\_ and  $0.\bar{3}$  is \_\_\_\_\_ greater than 0. Since  $0.\bar{3}$  is closer to \_\_\_\_\_ than it is to 0.4, plot the point closer to \_\_\_\_\_ on the number line.

**Step 3** Plot the point on the number line.

Plot the number  $0.\bar{3}$  on the number line at its approximate location.

### REMEMBER

Many rational numbers will not fall exactly on a hash mark of a number line.