

2.1 Lesson Rational Numbers

A **terminating decimal** is a decimal that ends.

$$1.5, -0.25, 10.625$$

A **repeating decimal** is a decimal that has a pattern that repeats.

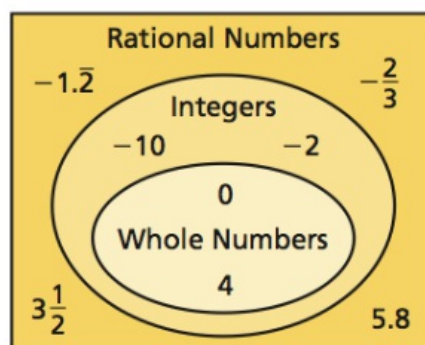
$$-1.333 \dots = -1.\overline{3}$$

$$0.151515 \dots = 0.\overline{15}$$

Use bar notation to show which of the digits repeat.

Terminating and repeating decimals are examples of *rational numbers*.

A **rational number** is a number that can be written as $\frac{a}{b}$ where a and b are integers and $b \neq 0$.



EXAMPLE 1 Writing Rational Numbers as Decimals

a. Write $-2\frac{1}{4}$ as a decimal.

Notice that $-2\frac{1}{4} = -\frac{9}{4}$.

Divide 9 by 4.

$$\begin{array}{r} 2.25 \\ 4 \overline{)9.00} \\ \underline{-8} \\ 10 \\ \underline{-8} \\ 20 \\ \underline{-20} \\ 0 \end{array}$$

The remainder is 0. So, it is a terminating decimal.

∴ So, $-2\frac{1}{4} = -2.25$.

b. Write $\frac{5}{11}$ as a decimal.

Divide 5 by 11.

$$\begin{array}{r} 0.4545 \\ 11 \overline{)5.0000} \\ \underline{-44} \\ 60 \\ \underline{-55} \\ 50 \\ \underline{-44} \\ 60 \end{array}$$

The remainder repeats. So, it is a repeating decimal.

∴ So, $\frac{5}{11} = 0.\overline{45}$.

EXAMPLE 2 Writing a Decimal as a Fraction

Write -0.26 as a fraction in simplest form.

$$-0.26 = -\frac{26}{100}$$

Write the digits after the decimal point in the numerator.

The last digit is in the hundredths place. So, use 100 in the denominator.

$$= -\frac{13}{50}$$

Simplify.

EXAMPLE 3 Ordering Rational Numbers

The table shows the elevations of four sea creatures relative to sea level. Which of the sea creatures are deeper than the whale? Explain.

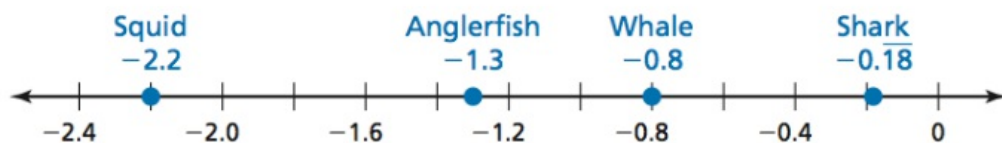
Creature	Elevations (km)
Anglerfish	$-\frac{13}{10}$
Squid	$-2\frac{1}{5}$
Shark	$-\frac{2}{11}$
Whale	-0.8

Write each rational number as a decimal.

$$-\frac{13}{10} = -1.3$$

$$-2\frac{1}{5} = -2.2$$

$$-\frac{2}{11} = -0.\overline{18}$$



Both -2.2 and -1.3 are less than -0.8 . So, the squid and the anglerfish are deeper than the whale.