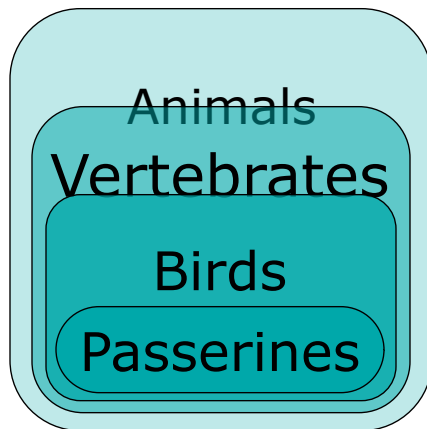


The Real Numbers Vocabulary

irrational number

real number

Biologists classify animals based on shared characteristics. The cardinal is an animal, a vertebrate, a bird, and a passerine.



You already know that some numbers can be classified as whole numbers, integers, or rational numbers.

Recall that rational numbers can be written as fractions and as decimals that either terminate or repeat.

$$3\frac{4}{5} = 3.8$$

$$\frac{2}{3} = 0.\overline{6}$$

$$\sqrt{1.44} = 1.2$$

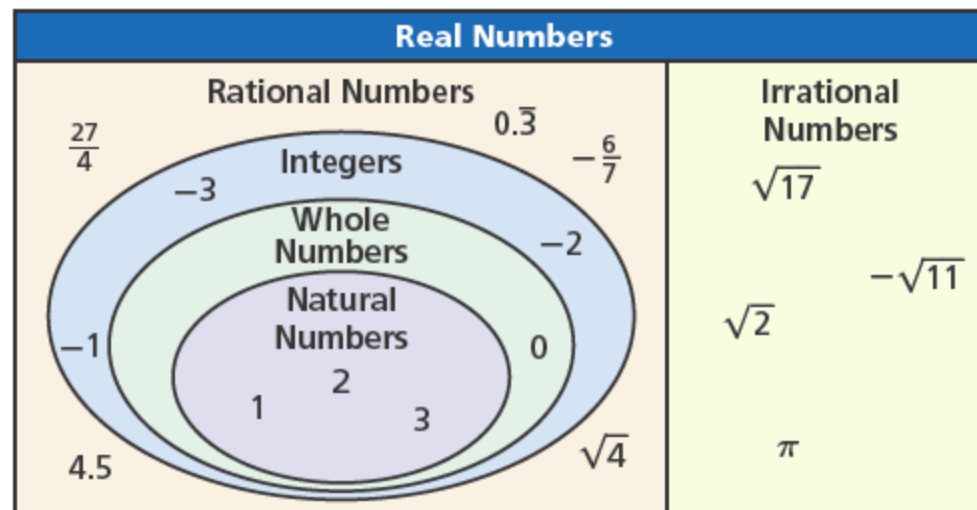
Irrational numbers can only be written as decimals that do *not* terminate or repeat. If a whole number is not a perfect square, then its square root is an irrational number.

$$\sqrt{2} \approx 1.41421356237\dots$$

Caution!

A repeating decimal may not appear to repeat on a calculator, because calculators show a finite number of digits.

The set of **real numbers** consists of the set of rational numbers and the set of irrational numbers.



Write all names that apply to each number.

A. $\sqrt{5}$ *5 is a whole number that is not a perfect square.*

irrational, real

B. -12.75 *-12.75 is a terminating decimal.*

rational, real

C. $\frac{\sqrt{16}}{2}$ $\frac{\sqrt{16}}{2} = \frac{4}{2} = 2$

whole, integer, rational, real

Write all names that apply to each number.

A. $\sqrt{9}$

$\sqrt{9} = 3$; natural, whole, integer, rational, real

B. $-\frac{3}{5}$

rational, real

C. **3.724**

rational, real

State if each number is rational, irrational, or not a real number.

A. $\frac{0}{3}$ $\frac{0}{3} = 0$

rational

B. $\sqrt{-4}$

not a real number

State if each number is rational, irrational, or not a real number.

C. $\sqrt{\frac{4}{9}}$ $\left(\frac{2}{3}\right)\left(\frac{2}{3}\right) = \frac{4}{9}$

rational

State if the number is rational, irrational, or not a real number. Justify your answer.

A. $\sqrt{-7}$

$\sqrt{-7}$ is not a real number because it is the square root of a negative number.

B. $-\frac{6}{0}$

$\frac{-6}{0}$ is not a real number because division by 0 is not defined.

State if the number is rational, irrational, or not a real number. Justify your answer.

C. $\sqrt{59 + 5}$

$$\sqrt{59 + 5} = \sqrt{64} = 8 \text{ is a rational number.}$$