

A **rational number** is **any number** that can be written as a **fraction**.

An **irrational number** cannot be written as a fraction.

Rational Numbers			Irrational Numbers
Integers (not fraction)	Terminating Decimals	Repeating Decimals	decimal goes indefinitely without a repeating pattern
$3 = \frac{3}{1}$ $\sqrt{4} = \frac{2}{1}$ $5^2 = \frac{25}{1}$ $0 = \frac{0}{1}$ $-12 = \frac{-12}{1}$	$1.4 = \frac{7}{5}$ $-1.5 = \frac{-3}{2}$ $3.79 = \frac{379}{100}$  All terminating decimals are rational	$.\bar{3} = \frac{1}{3}$ $.\overline{123} = \frac{41}{333}$ $-\overline{.18} = \frac{-2}{11}$  All repeating decimals are rational	$\sqrt{2} = 1.4142\dots$ $\pi = 3.14159\dots$  $\pi = 3.1415926$ $535897932384$ $62640\dots$

## CFU

Select one or more rational numbers that are integers. Explain.

- A.  $\sqrt{16}$       B.  $\frac{5}{0}$       C. 5,020      D. -77

Select one or more rational numbers that are terminating decimals. Explain.

- A. 1.5      B. 2.666...      C. -10.5      D.  $0.2\bar{5}$

- 1 If possible, write the number as a fraction in simplest form.
- 2 Classify the number as **rational** or **irrational**. If it is rational, classify it as an **integer**, a **terminating decimal**, or a **repeating decimal**.
- 3 Interpret the answer. (“\_\_\_ is \_\_\_ because...”)

1.                      4

2.                      7

3.                      -11

4.                      -9

5.                       $\frac{10}{5}$

6.                       $\frac{18}{6}$

7.                       $\frac{7}{6}$

8.                       $\frac{8}{5}$

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9.  $0.62$

10.  $-2.18$

11.  $-0.\bar{5}$

12.  $-3.\bar{4}$

13.  $\sqrt{25}$

14.  $\sqrt{9}$

15.  $\sqrt{3} = 1.73205080\dots$

16.  $\sqrt{5} = 2.2360679775\dots$

## Skill Closure

- 1 If possible, write the number as a fraction in simplest form.
- 2 Classify the number as **rational** or **irrational**. If it is rational, classify it as an **integer**, a **terminating decimal**, or a **repeating decimal**.
- 3 Interpret the answer. ("\_\_\_ is \_\_\_ because...")

1.  $-17 = \frac{-17}{1}$

2.  $\frac{100}{25} = \frac{4}{1}$

3.  $.2 = \frac{2}{9}$

4.  $.241 = \frac{241}{1000}$

## Concept Closure

Read and solve the problem.

Quinton classified  $\sqrt{15}$  as a rational number and an integer. Is he correct? Explain.

$$\sqrt{15} = 3.87298334621...$$

## Summary Closure

What did you learn today about distinguishing between rational and irrational numbers?

## Word Bank

rational  
irrational  
integer  
terminating decimal  
repeating decimal  
fraction

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- 2 Classify the number as **rational** or **irrational**. If it is rational, classify it as an **integer**, a **terminating decimal**, or a **repeating decimal**.
- 3 Interpret the answer. ("\_\_\_ is \_\_\_ because...")

1.

21

2.

-4

3.

-16

4.

50

5.

 $\frac{32}{4}$ 

6.

 $\frac{11}{3} = 3.\bar{6}$ 

7.

 $\frac{12}{9} = 1.\bar{3}$ 

8.

 $\frac{66}{3}$

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- 2 Classify the number as **rational** or **irrational**. If it is rational, classify it as an **integer**, a **terminating decimal**, or a **repeating decimal**.
- 3 Interpret the answer. ("\_\_\_ is \_\_\_ because...")

9.  $-0.28 = \frac{-28}{100} = \frac{-7}{25}$

10.  $1.\bar{7} = \frac{16}{9}$

11.  $.\bar{79} = \frac{79}{99}$

12.  $4.51 = \frac{451}{100}$

13.  $\sqrt{11} = 3.31662479\dots$

14.  $\sqrt{144}$

15.  $\sqrt{81}$

16.  $\sqrt{15} = 3.872983\dots$

**Classify numbers as rational or irrational.**

If rational, classify as **integer**, **terminating decimal**, or **repeating decimal**.

1. $-31$	2. $\frac{60}{6}$
3. $\frac{47}{5} = 9.4$	4. $\frac{2}{3} = .6\overline{6}$
5. $\sqrt{169} = \frac{13}{1}$	6. $\sqrt{18} = \sqrt{9 \times 2} = 3\sqrt{2}$
7. $0.99$	8. $-8.6$

Choose Yes or No to indicate whether each statement about rational numbers is true or false.

- All rational numbers can be written as a ratio of two integers. ☐ Yes ☐ No
- All rational numbers are integers. ☐ Yes ☐ No
- All whole numbers are rational numbers. ☐ Yes ☐ No
- The number  $-37.5$  is a rational number. ☐ Yes ☐ No

**Classify numbers as rational or irrational.**

If rational, classify as **integer**, **terminating decimal**, or **repeating decimal**.

1. $-44$	2. $3.\overline{27}$
3. $\frac{15}{5} = 3.75$	4. $\sqrt{90} = 3 \times \sqrt{10}$
5. $\sqrt{78} = 8.831\dots$	6. $\sqrt{400} = 20$
7. $\sqrt{2}$	8. $5.25$

Choose Yes or No to indicate whether each statement about rational numbers is true or false.

All integers are rational numbers.

☐ Yes ☐ No

All fractions are rational numbers.

☐ Yes ☐ No

All repeating decimals are rational.

☐ Yes ☐ No

The number  $\sqrt{2}$  is rational.

☐ Yes ☐ No



Classify numbers as rational or irrational.

1. $\sqrt{144} = 12$	2. $\sqrt{46} = 6.7823...$
3. $33$	4. $\frac{33}{10} = 3.3$
5. $\frac{100}{25} = 4$	6. $\sqrt{101}$
7. $3.14159...$	8. $3.\overline{14}$

Choose Yes or No to indicate whether each statement about irrational numbers is true or false.

- Irrational numbers cannot be written as a ratio of two integers. O Yes O No
- All irrational numbers are fractions. O Yes O No
- All numbers are irrational numbers. O Yes O No
- The number  $\sqrt{100}$  is an irrational number. O Yes O No