

Reteaching 1-1

Rational Numbers

A fraction is in simplest form when the *greatest common factor* (GCF) of the numerator and denominator is 1.

Example 1: Write $\frac{24}{36}$ in simplest form.

Use prime factorization and circle the common factors.

$$\begin{array}{l} 24 = (2) \cdot (2) \cdot 2 \cdot (3) \\ 36 = (2) \cdot (2) \cdot 3 \cdot (3) \end{array}$$

So, $\frac{24}{36} = \frac{2}{3}$.

To write a fraction as a decimal:

- ① Divide numerator by denominator.
- ② Divide until the remainder is 0 or until the remainder repeats.
- ③ Use a bar to show digits repeating.

Example 2: Write $\frac{5}{6}$ as a decimal.

$$\begin{array}{r} 0.833 \\ 6 \overline{)5.000} \\ \underline{-48} \\ 20 \\ \underline{-18} \\ 20 \\ \underline{-18} \\ 2 \leftarrow \text{Remainder repeats.} \end{array}$$

So $\frac{5}{6} = 0.833\ldots$, or $0.8\overline{33}$.

To write a decimal as a fraction:

Example 3: Write 0.375 as a fraction.

- ① Write as a fraction with the denominator 1. $0.375 = \frac{0.375}{1}$
 - ② Since there are 3 digits to the right of the decimal point, multiply the numerator and the denominator by 1,000. $= \frac{375}{1000}$
 - ③ Divide the numerator and denominator by the GCF. $= \frac{375 \div 125}{1000 \div 125}$
 - ④ Simplify. $= \frac{3}{8}$
- So $0.375 = \frac{3}{8}$.

Write each fraction in simplest form.

- | | | |
|------------------------------------|------------------------------------|----------------------------------|
| 1. $\frac{16}{64} = \frac{1}{4}$ | 2. $-\frac{30}{48} = -\frac{5}{8}$ | 3. $\frac{42}{63} = \frac{2}{3}$ |
| 4. $-\frac{32}{40} = -\frac{4}{5}$ | 5. $-\frac{12}{28} = -\frac{3}{7}$ | 6. $\frac{18}{27} = \frac{2}{3}$ |

Write each fraction or mixed number as a decimal rounded to three decimal places.

- | | | |
|----------------------------|-----------------------------|----------------------------|
| 7. $\frac{7}{9} = 0.778$ | 8. $-3\frac{2}{7} = -3.286$ | 9. $\frac{5}{9} = 0.556$ |
| 10. $5\frac{3}{7} = 5.429$ | 11. $\frac{4}{3} = 1.333$ | 12. $\frac{1}{11} = 0.091$ |

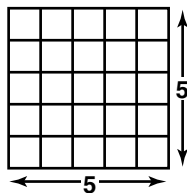
Write each decimal as a mixed number or fraction in simplest form.

- | | | |
|---------------------------|-----------------------------|---------------------------|
| 13. 0.2 = $\frac{1}{5}$ | 14. 0.16 = $\frac{4}{25}$ | 15. 0.3 = $\frac{3}{10}$ |
| 16. 2.75 = $2\frac{3}{4}$ | 17. 4.52 = $4\frac{13}{25}$ | 18. 0.36 = $\frac{9}{25}$ |

Reteaching 1-2

Irrational Numbers and Square Roots

- The *square* of 5 is 25.
 $5 \cdot 5 = 5^2 = 25$
- The *square root* of 25 is 5
because $5^2 = 25$.



$$\left. \begin{array}{l} 1^2 = 1 \\ 2^2 = 4 \\ 3^2 = 9 \\ 4^2 = 16 \\ 5^2 = 25 \end{array} \right\} \text{perfect squares}$$

$$\sqrt{25} = 5$$

Example: You can use a calculator to find square roots.
Find $\sqrt{36}$ and $\sqrt{21}$ to the nearest tenth.

$$36 \sqrt{\quad} = 6 \quad 21 \sqrt{\quad} \approx 4.5825757 \approx 4.6$$

You can estimate square roots like $\sqrt{52}$ and $\sqrt{61}$.

Perfect squares	↗ 49		$\sqrt{49} = 7$		$\sqrt{49} = 7$
	↘ 52	Estimate	$\sqrt{52} \approx 7$	Estimate	$\sqrt{61} \approx 8$
	↘ 64		$\sqrt{64} = 8$		$\sqrt{64} = 8$

**Find each square root. Estimate to the nearest integer if necessary.
Use \approx to show that a value is estimated.**

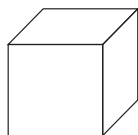
- | | | | |
|--------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|
| 1. $\sqrt{16}$
_____ 4 | 2. $\sqrt{85}$
_____ ≈ 9 | 3. $\sqrt{26}$
_____ ≈ 5 | 4. $\sqrt{36}$
_____ 6 |
| 5. $\sqrt{98}$
_____ ≈ 10 | 6. $\sqrt{40}$
_____ ≈ 6 | 7. $\sqrt{100}$
_____ 10 | 8. $\sqrt{18}$
_____ ≈ 4 |
| 9. $\sqrt{5}$
_____ ≈ 2 | 10. $\sqrt{121}$
_____ 11 | 11. $\sqrt{68}$
_____ ≈ 8 | 12. $\sqrt{144}$
_____ 12 |
| 13. $\sqrt{29}$
_____ ≈ 5 | 14. $\sqrt{64}$
_____ 8 | 15. $\sqrt{37}$
_____ ≈ 6 | 16. $\sqrt{75}$
_____ ≈ 9 |

17. If a whole number is not a perfect square, its square root is an *irrational number*.
List the numbers from exercises 1–16 that are irrational.

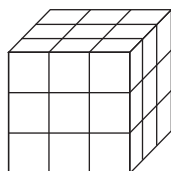
$\sqrt{85}, \sqrt{26}, \sqrt{98}, \sqrt{40}, \sqrt{18}, \sqrt{5}, \sqrt{68}, \sqrt{29}, \sqrt{37}, \sqrt{75}$

Reteaching 1-3

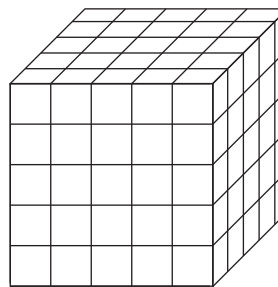
Cube Roots



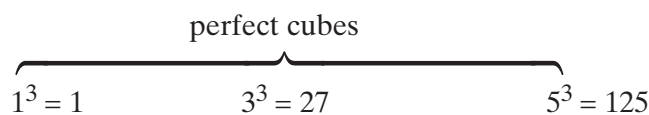
The cube of 1 is 1.
 $1 \times 1 \times 1 = 1^3 = 1$



The cube of 3 is 27.
 $3 \times 3 \times 3 = 3^3 = 27$



The cube of 5 is 125.
 $5 \times 5 \times 5 = 5^3 = 125$



Example: You can solve cube root equations: $x^3 = \frac{27}{216}$

$$\begin{aligned} \sqrt[3]{x^3} &= \sqrt[3]{\frac{27}{216}} \leftarrow \text{Find the cube root of each side.} \\ &= \frac{\sqrt[3]{27}}{\sqrt[3]{216}} \leftarrow \text{Find the cube root of the numerator and denominator.} \\ x &= \frac{3}{6} = \frac{1}{2} \leftarrow \text{Simplify.} \end{aligned}$$

Find the cube root of each number.

1. 729

9

2. 125

5

3. 512

8

4. -64

-4

5. $\frac{1}{216}$

$\frac{1}{6}$

6. $\frac{125}{1000}$

$\frac{5}{10} = \frac{1}{2}$

Solve each equation by finding the value of x .

7. $x^3 = 27$

3

8. $x^3 = 1,728$

12

9. $x^3 = \frac{343}{729}$

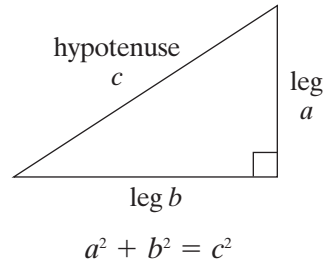
$\frac{7}{9}$

Reteaching 1-4

The Pythagorean Theorem

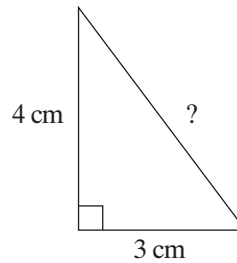
The Pythagorean Theorem

The sum of the squares of the lengths of the legs of a right triangle is equal to the square of the length of the hypotenuse.



Example 1: Find the length of the hypotenuse.

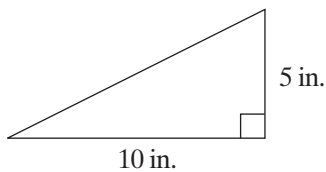
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 3^2 + 4^2 &= c^2 \\ 9 + 16 &= c^2 \\ 25 &= c^2 \\ \sqrt{25} &= c \\ 5 &= c \end{aligned}$$



The length c of the hypotenuse is 5 cm.

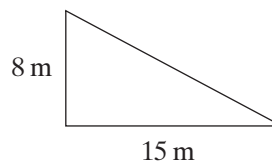
Find the length of the hypotenuse of each triangle. If necessary, round to the nearest tenth.

1.



11.2 in.

2.



17 m

The lengths of the legs of a right triangle are given. Find the length of the hypotenuse.

3. legs: 6 ft and 8 ft
hypotenuse:

10 ft

4. legs: 12 cm and 5 cm
hypotenuse:

13 cm

5. legs: 24 mm and 7 mm
hypotenuse:

25 mm

6. legs: 15 yd and 20 yd
hypotenuse:

25 yd

7. legs: 0.024 m and 0.007 m
hypotenuse:

0.025 m

8. legs: 3,000 mi and 4,000 mi
hypotenuse:

5,000 mi

Reteaching 1-5

Using the Pythagorean Theorem

You can use the Pythagorean Theorem to find the length of a leg in a right triangle.

Example: Find the length of the unknown side.

$$a^2 + b^2 = c^2$$

$$6^2 + b^2 = 10^2$$

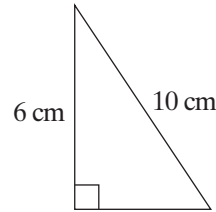
$$36 + b^2 = 100$$

$$b^2 = 100 - 36$$

$$b^2 = 64$$

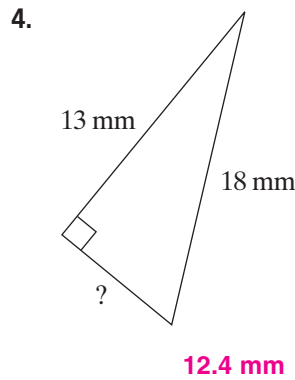
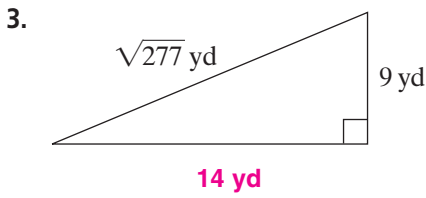
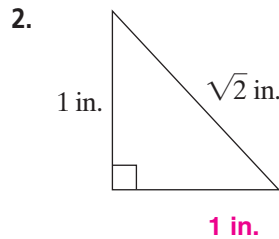
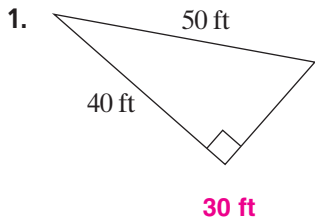
$$b = \sqrt{64}$$

$$b = 8$$



The length b of the unknown leg is 8 cm.

Find the missing leg length. If necessary, round to the nearest tenth.



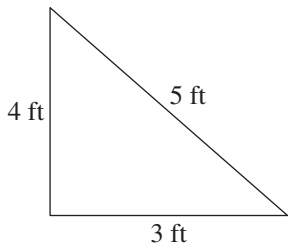
5. Marcus leans a 12-ft ladder against a wall to clean a window. If the base of the ladder is 3 feet away from the wall, how high up the wall does the ladder reach? If necessary, round to the nearest tenth.

11.6 ft

Reteaching 1-6

Converse of the Pythagorean Theorem

You can use the Pythagorean Theorem to determine whether a triangle is a right triangle.



$$a^2 + b^2 \stackrel{?}{=} c^2 \leftarrow \text{Use the Pythagorean Theorem.}$$

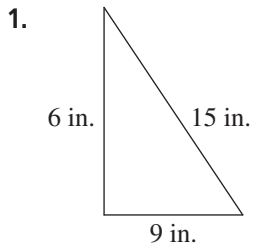
$$3^2 + 4^2 \stackrel{?}{=} 5^2 \leftarrow \text{Substitute 3 for } a, 4 \text{ for } b, \text{ and 5 for } c.$$

$$9 + 16 \stackrel{?}{=} 25 \leftarrow \text{Simplify.}$$

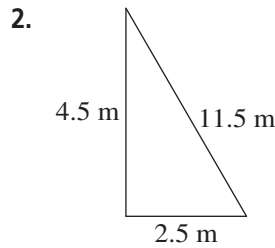
$$25 = 25$$

The equation is true so the triangle is a right triangle.

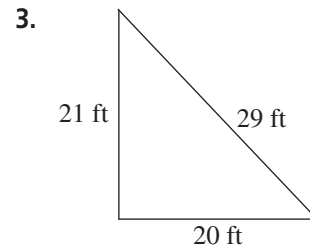
Determine whether the given lengths can be side lengths of a right triangle.



No



Yes



Yes

4. 8 mm, 14 mm, 26 mm

No

5. 12 cm, 5 cm, 13 cm

Yes

6. 9 yd, 40 yd, 25 yd

No

Reteaching 1-7

Distance in the Coordinate Plane

You can graph a point on a *coordinate plane*. Use an *ordered pair* (x, y) to record the coordinates. The first number in the pair is the *x-coordinate*. The second number is the *y-coordinate*.

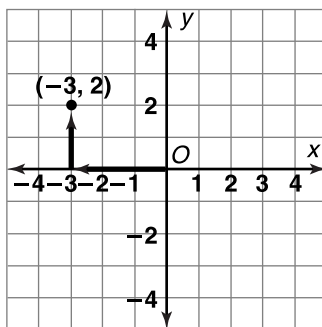
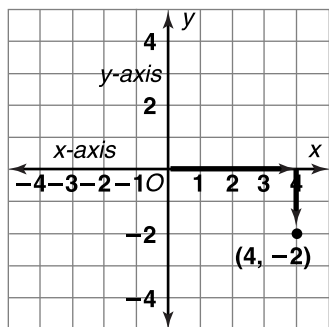
To graph a point, start at the origin, O . Move horizontally according to the value of x . Move vertically according to the value of y .

Example 1: $(4, -2)$

Start at O , move right 4, then down 2.

Example 2: $(-3, 2)$

Start at O , move left 3, then up 2.



Graph each ordered pair on the coordinate plane. Label each point with its letter. Then connect the points in order from A to S. Connect point S with point A to complete a picture.

- | | |
|-------------|-------------|
| $A(7, 7)$ | $J(-4, -6)$ |
| $B(6, 3)$ | $K(-7, -7)$ |
| $C(6, 2)$ | $L(-5, 1)$ |
| $D(5, 1)$ | $M(-6, 2)$ |
| $E(7, -7)$ | $N(-6, 3)$ |
| $F(4, -6)$ | $P(-7, 7)$ |
| $G(1, -2)$ | $Q(-1, 3)$ |
| $H(0, -4)$ | $R(0, 4)$ |
| $I(-1, -2)$ | $S(1, 3)$ |

