

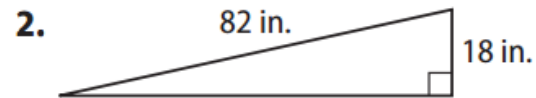
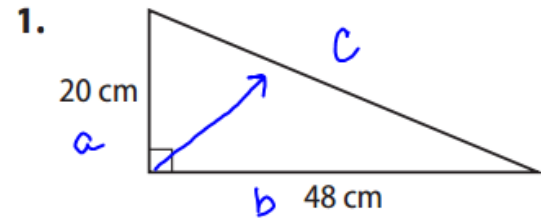
12.2 Converse of the Pythagorean Theorem

Common Core Standard

8.G.6

Explain a proof of the Pythagorean Theorem and its converse

Find the length of the missing side of each triangle.



3. A box used for shipping a volleyball set measures 10 inches by 20 inches by 40 inches. What is the longest length of support pole that will fit into the box, rounded to a tenth of an inch?

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

$$20^2 + 48^2 = c^2$$

$$400 + 2304 = c^2$$

$$\sqrt{2704} = \sqrt{c^2}$$

$$52 = c$$

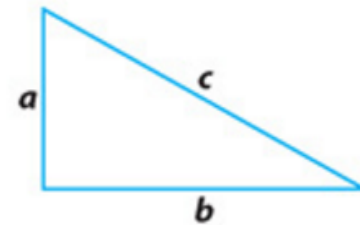
12.2 Converse of the Pythagorean Theorem

Common Core Standard

8.G.6

Explain a proof of the Pythagorean Theorem and its converse

The Pythagorean Theorem states that if a triangle is a right triangle, then

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


The converse of the Pythagorean Theorem states that if

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

then the triangle is a right triangle

Decide whether the converse of the Pythagorean Theorem is true.

- A** Verify that the following sets of lengths make the equation $a^2 + b^2 = c^2$ true. Record your results in the table.

a	b	c	Is $a^2 + b^2 = c^2$ true?	Makes a right triangle?
3	4	5	yes	yes
5	12	13	yes	yes
7	24	25	yes	yes
8	15	17	yes	yes
20	21	29	yes	yes

Tell whether each triangle with the given side lengths is a right triangle.

A 9 inches, 40 inches, and 41 inches

a b c

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

$$9^2 + 40^2 = 41^2$$

$$81 + 1600 = 1681$$

$$1681 = 1681 \checkmark$$

Right
Triangle

B 8 meters, 10 meters, and 12 meters

a b c

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

$$8^2 + 10^2 = 12^2$$

$$64 + 100 = 144$$

$$164 \neq 144$$

Not a right
triangle

Tell whether each triangle with the given side lengths is a right triangle.

A 16 inches, 30 inches, 34 inches

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

$$16^2 + 30^2 = 34^2$$

$$256 + 900 = 1156$$

$$1156 = 1156 \quad \checkmark$$

B 14 feet, 49 feet, 51 feet

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

$$14^2 + 49^2 = 51^2$$

$$196 + 2401 = 2601$$

$$2597 \neq 2601$$

Tell whether each triangle with the given side lengths is a right triangle.

2. 14 cm, 23 cm, and 25 cm

no

3. 16 in., 30 in., and 34 in.

yes

4. 27 ft, 36 ft, 45 ft

yes

5. 11 mm, 18 mm, 21 mm

no



Katya is buying edging for a triangular flower garden she plans to build in her backyard. If the lengths of the three pieces of edging that she purchases are 13 feet, 10 feet, and 7 feet, will the flower garden be in the shape of a right triangle?

Use the converse of the Pythagorean Theorem. Remember to use the longest length for c .

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

$$7^2 + 10^2 = 13^2$$

$$49 + 100 = 169$$

$$149 \neq 169$$

Not
a
right
triangle

A small triangular park at the intersection of 3 streets has side lengths 19 feet, 80 feet, and 82 feet. Does the park have the shape of a right triangle?

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

$$19^2 + 80^2 = 82^2$$

$$361 + 6400 = 6724$$

$$6761 \neq 6724$$

Not a
right
triangle

6. A blueprint for a new triangular playground shows that the sides measure 480 ft, 140 ft, and 500 ft. Is the playground in the shape of a right triangle? Explain.

$$\begin{aligned} \text{yes} \quad 140^2 + 480^2 &= 500^2 \\ 25000 &= 25000 \end{aligned}$$

7. A triangular piece of glass has sides that measure 18 in., 19 in., and 25 in. Is the piece of glass in the shape of a right triangle? Explain.

$$\begin{aligned} \text{No} \\ 18^2 + 19^2 &\neq 25^2 \end{aligned}$$

8. A corner of a fenced yard forms a right angle. Can you place a 12 foot long board across the corner to form a right triangle for which the leg lengths are whole numbers? Explain.

No

H/W

P 384

1-4

P 385

5-18