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Pythagorean Theorem

The Pythagorean theorem can be used to find the lengths of the sides of right triangles. The hypotenuse of a right triangle is the side opposite the right angle. It is the longest side. The other two sides are called the legs of the triangle.

Pythagorean Theorem. *In any right triangle, the square of the length of the hypotenuse equals the sum of the squares of the lengths of the legs.*

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

Example 1. The length of one side of a right triangle is 28 cm. The length of the hypotenuse is 53 cm. Write and solve an equation for the length of the unknown side.

Example 2. State whether or not the three given figures could represent the lengths of a right triangle.

(a) 8, 15, 17 (b) 16, 24, 30 (c) $\frac{5}{6}$, 2, $\frac{13}{6}$

(d) 7, 24, 25 (e) 0.3, 0.4, 0.5 (f) 2.5, 6.0, 6.5

Find the missing lengths.

(1) $a = 10$, $b = 24$, $c =$_____ (2) $a = 5$, $b = 12$, $c =$_____

(3) $a = 6$, $b = 8$, $c =$_____ (4) $a = 12$, $b = 16$, $c =$_____

(5) $a = 9$, $b = 40$, $c =$_____ (6) $a = 15$, $b = 20$, $c =$_____

(7) $a =$_____, $b = 21$, $c = 29$ (8) $a = 696$, $b =$_____, $c = 985$

(9) $a =$_____, $b = 42$, $c = 58$ (10) $a = 12$, $b =$_____, $c = 37$

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Prove/Disprove that the following triples satisfy in the Pythagorean Theorem

(1) 3, 4, 5 (2) 8, 6, 10 (3) 5, 12, 13

(4) 15, 8, 17 (5) 7, 24, 25 (6) 24, 10, 26

(7) 21, 20, 29 (8) 16, 30, 34 (9) 9, 40, 41

(10) 35, 12, 37 (11) 33, 56, 65 (12) 63, 16, 65

Figure out the next numbers in the Pythagorean triples sequence

3	4	5
5	12	13
7	24	25
9	40	41
11	60	61
13	84	85
15	112	113
17	144	145
19	180	181
21	220	221