

Geometry CC - Unit 8
Lesson 2: Pythagorean Theorem
M2 LO

Do Now: Express each in simplest radical form (algebra review):

a) $\sqrt{300}$
 $\sqrt{100 \cdot 3}$
 $10\sqrt{3}$

b) $\sqrt{45}$
 $\sqrt{9 \cdot 5}$
 $3\sqrt{5}$

c) $\sqrt{x^2 y^6}$
 $x \cdot y^3$

d) $5\sqrt{72}$
 $5\sqrt{36 \cdot 2}$
 $5 \cdot 6\sqrt{2}$
 $30\sqrt{2}$

e) $3\sqrt{168}$
 $3\sqrt{4 \cdot 42}$
 $3(2)\sqrt{42}$
 $6\sqrt{42}$

f) $x^2\sqrt{108}$
 $x^2\sqrt{36 \cdot 3}$
 $6x^2\sqrt{3}$

Perfect Squares	
$1^2 =$	1
$2^2 =$	4
$3^2 =$	9
$4^2 =$	16
$5^2 =$	25
$6^2 =$	36
$7^2 =$	49
$8^2 =$	64
$9^2 =$	81
$10^2 =$	100
$11^2 =$	121
$12^2 =$	144
$13^2 =$	169
$14^2 =$	196
$15^2 =$	225


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The Pythagorean Theorem

The mathematical relationship stating that in any right triangle, the Sum of the squares of the two legs is equal to the square of the hypotenuse.

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

The Pythagorean Theorem may also be used to prove that three sides of a triangle are the sides of a right triangle. If $a^2 + b^2 = c^2$ then the triangle is a right triangle.

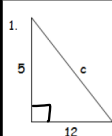


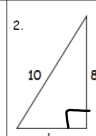
The Pythagorean Theorem ONLY works in Right Triangles!

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In each example below, c represents the length of the hypotenuse of a right triangle and a and b represent the length of the legs.

Find the length of each missing side: a) In simplest radical form:

1. 
 $5^2 + 12^2 = c^2$
 $25 + 144 = c^2$
 $\sqrt{169} = \sqrt{c^2}$
 $c = 13$

2. 
 $b^2 + 8^2 = 10^2$
 $b^2 + 64 = 100$
 $b^2 = 36$
 $b = 6$

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3. $b = \sqrt{3}, c = \sqrt{15}$
 $a^2 + b^2 = c^2$
 $a^2 + (\sqrt{3})^2 = (\sqrt{15})^2$
 $a^2 + 3 = 15$
 $\sqrt{a^2} = \sqrt{12}$
 $a = \sqrt{4} \sqrt{3}$
 $= 2\sqrt{3}$

4. $a = 4\sqrt{2}, c = 8$
 $a^2 + b^2 = c^2$
 $(4\sqrt{2})^2 + b^2 = 8^2$
 $(4\sqrt{2})(4\sqrt{2}) + b^2 = 64$
 $16(2) + b^2 = 64$
 $32 + b^2 = 64$
 $\sqrt{b^2} = \sqrt{32}$
 $b = \sqrt{16} \sqrt{2}$
 $b = 4\sqrt{2}$

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