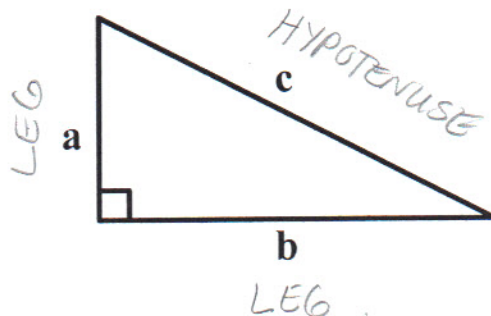


# C10L1 Notes

## The Pythagorean Theorem

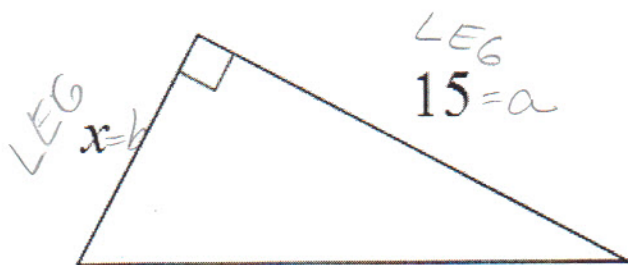
In any right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.

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



Use the Pythagorean Theorem to find the missing side length of the right triangle. Round your answer to the nearest tenth if necessary.

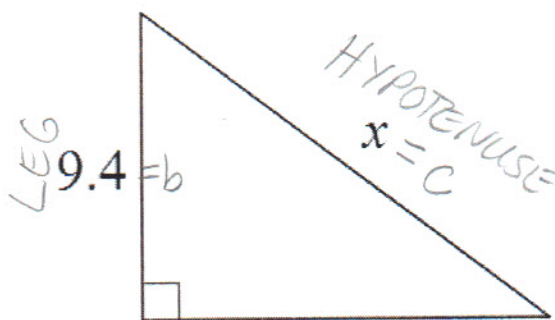
1.



$$\begin{aligned} 17 &= c \\ \text{HYPOTENUSE} \\ c^2 &= a^2 + b^2 \\ 17^2 &= 15^2 + x^2 \\ 289 &= 225 + x^2 \\ 64 &= x^2 \\ \sqrt{64} &= \sqrt{x^2} \\ x &= \pm 8 \end{aligned}$$

DISTANCE CANNOT BE NEGATIVE,  
SO  $x = 8$

2.



$$\begin{aligned} 12.5 &= a \\ \text{LEG} \\ c^2 &= a^2 + b^2 \\ x^2 &= 12.5^2 + 9.4^2 \\ x^2 &= 244.61 \\ \sqrt{x^2} &= \sqrt{244.61} \\ x &= \pm 15.6 \\ x &= 15.6 \end{aligned}$$

THE HYPOTENUSE (C) IS ALWAYS THE LONGEST SIDE.

Use the Pythagorean Theorem to determine whether the lengths of the sides of the triangle represent a right triangle.

3. 20 in, 21 in, 29 in

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

$$29^2 \stackrel{?}{=} 20^2 + 21^2$$

$$841 \stackrel{?}{=} 400 + 441$$

$$841 = 841$$

YES, IT IS  
A RT.  $\Delta$ .

4. 8 in, 17 in, 16 in

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

$$17^2 \stackrel{?}{=} 8^2 + 16^2$$

$$289 \stackrel{?}{=} 64 + 256$$

$$289 \neq 320$$

NO, IT IS NOT  
A RT  $\Delta$ .

Use the Pythagorean Theorem to determine whether the set of three numbers is a Pythagorean Triple. THIS MEANS THE SAME AS

5. 12, 31, 37

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

$$37^2 \stackrel{?}{=} 12^2 + 31^2$$

$$1369 \stackrel{?}{=} 144 + 961$$

$$1369 \neq 1105$$

NO, IT IS NOT  
A PYTHAGOREAN  
TRIPLE.

6. 7, 24, 25

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

$$25^2 \stackrel{?}{=} 7^2 + 24^2$$

$$625 \stackrel{?}{=} 49 + 576$$

$$625 = 625$$

YES, IT IS A  
PYTHAGOREAN  
TRIPLE.

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