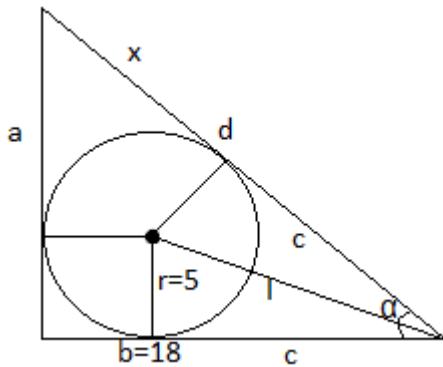


Answer on Question # 41848– Math – Algebra

I have to find the portion of the distance "x" of hypotenuse, of a right triangle with one leg equal 18, a circle inside the triangle with a radius of 5. There's a letter "C" inside the circle. Also, the teacher said to put the letter "C", down by the leg with the value of 18. I have no other information. The distance "x" is not specified as anything. It's just a portion of the hypotenuse! Help!!!

Solution:

Let d denotes a hypotenuse, and a, b denote the legs



The parts of legs that are marked by c are equal.

The radius of the inscribed circle in the right triangle is calculated by the formula $r = \frac{a+b-d}{2}$.

So, we get $5 = \frac{a+18-d}{2}$, hence $a = d - 8$. From Pythagorean theorem we get $d^2 = a^2 + 18^2$, substituting $a = d - 8$, we get $d^2 = (d - 8)^2 + 324$.

$$d^2 = d^2 - 16d + 64 + 324$$

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$$16d = 388$$

$$d = 24.25$$

Thus, $a = 24.25 - 8 = 16.25$. Now, let's find the value of $\cos \alpha = \frac{b}{d} = \frac{18}{24.25} = 0.74$. $\sin \frac{\alpha}{2} = \sqrt{\frac{1-\cos \alpha}{2}} = \sqrt{\frac{1-0.74}{2}} = 0.359$, $\cos \frac{\alpha}{2} = \sqrt{\frac{1+\cos \alpha}{2}} = \sqrt{\frac{1+0.74}{2}} = 0.933$, $\tan \frac{\alpha}{2} = \frac{\sin \frac{\alpha}{2}}{\cos \frac{\alpha}{2}} = 0.385$. So, $c = \frac{r}{\tan \frac{\alpha}{2}} = 13$. Hence, $x = 24.5 - 13 = 11.5$.

Answer: $x = 11.5$.