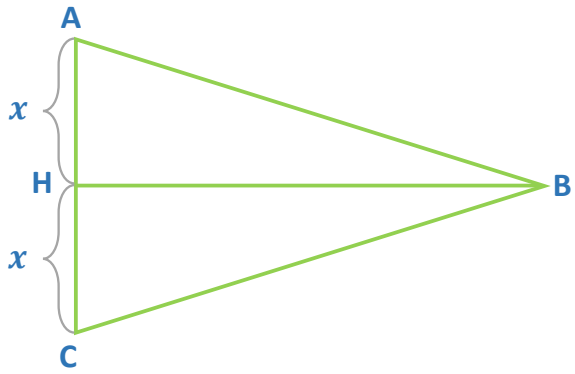
Answer on Question #37824 – Math - Algebra



We have the isosceles triangle ABC. The width $AC = 2x$, the height BH is 5 inches smaller than its width, $BH = 2x - 5$, and $AB = 42.54$ in. Using the Pythagorean theorem:

$$AH^2 + BH^2 = AB^2$$

$$x^2 + (2x - 5)^2 = 42.54^2$$

$$x^2 + 4x^2 + 25 - 20x = 1809.6516$$

$$5x^2 - 20x + 25 - 1809.6516 = 0$$

$$x^2 - 4x - 356.93032 = 0$$

$$x_{1,2} = \frac{4 \pm \sqrt{16 - 4 \cdot 356.93032}}{2} = 2 \pm \sqrt{360.93032}$$

$$x_1 = 20.99817, x_2 = -16.99817$$

So the width $AC = 2x_1$, because the width cannot be negative.

$$AC = 2 \cdot 20.99817 = 41.99634 \text{ (in)}$$

$$BH = 2 \cdot 20.99817 - 5 = 36.99634 \text{ (in)}$$

Answer:

a) 36.99634 inches;
b) 41.99634 inches.