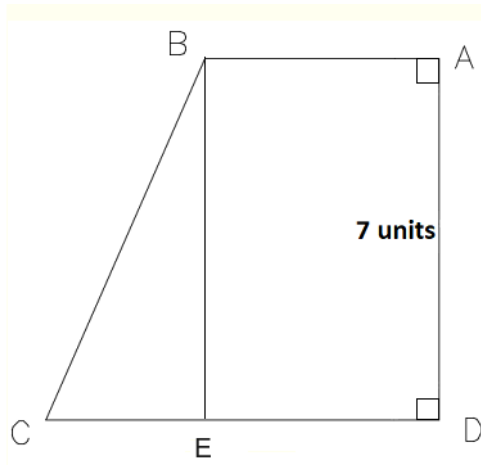


Trapezoidal Problem

Let E be the base of a perpendicular from B to CD (see the picture below)



Applying Pythagoras theorem in the triangle $\triangle CEB$, and using the equalities $\overline{BE} = \overline{AD}$ and $\overline{CE} = \overline{CD} - \overline{AB}$ we have

$$(\overline{BC})^2 = (\overline{AD}^2) + (\overline{CD} - \overline{AB})^2$$

$$(\overline{BC})^2 = (\overline{AD}^2) + (\overline{CD}^2) + (\overline{AB}^2) - 2(\overline{CD})(\overline{AB})$$

$$2(\overline{CD})(\overline{AB}) = (\overline{AD}^2) + (\overline{CD}^2) + (\overline{AB}^2) - (\overline{BC})^2$$

Substituting BC with the expression supplied by the statement of the problem,

$$2(\overline{CD})(\overline{AB}) = (\overline{AD}^2) + (\overline{CD}^2) + (\overline{AB}^2) - (\overline{AB} + \overline{CD})^2$$

$$2(\overline{CD})(\overline{AB}) = (\overline{AD}^2) + (\overline{CD}^2) + (\overline{AB}^2) - (\overline{AB}^2) - (\overline{CD}^2) - 2(\overline{CD})(\overline{AB})$$

$$4(\overline{CD})(\overline{AB}) = (\overline{AD}^2)$$

$$(\overline{CD})(\overline{AB}) = \frac{49}{4}$$