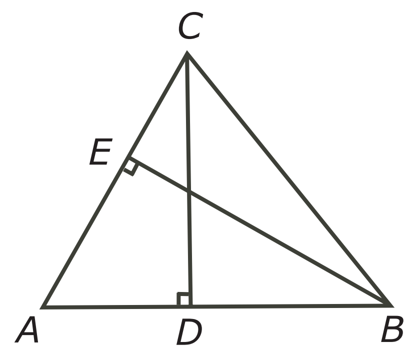
Problem of the Week
Problem C and Solution
New Heights (Revised)

Problem

An *altitude* is a line segment drawn from a vertex of a triangle to the opposite side or opposite side extended such that the line segment is perpendicular to the opposite side. In $\triangle ABC$, CD is an altitude. $AB = 18$ cm, $AC = 20$ cm and $CD = 16$ cm. An altitude is drawn from B to AC intersecting at E. Determine the length of BE.



Solution

The area of a triangle is determined using the formula $base \times height \div 2$. The height of the triangle is the length of an altitude and the base of the triangle is the length of the side to which a particular altitude is drawn.

$$\begin{aligned}
\text{Area } \triangle ABC &= \frac{(CD) \times (AB)}{2} \\
&= \frac{16 \times 18}{2} \\
&= 144 \text{ cm}^2 \\
\text{But, Area } \triangle ABC &= \frac{(BE) \times (AC)}{2} \\
144 &= \frac{(BE) \times 20}{2} \\
144 &= 10 \times BE \\
14.4 \text{ cm} &= BE
\end{aligned}$$

Therefore, the length of altitude BE is 14.4 cm.

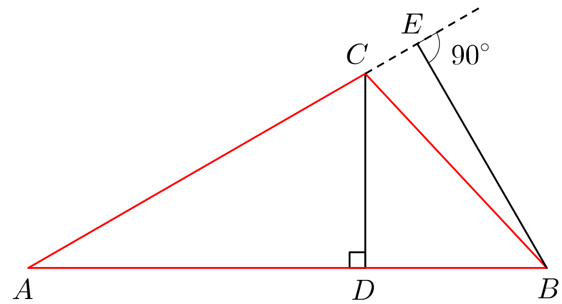
Problem of the Week

Problem C and Solution

New Heights (Original Problem)

Problem

An *altitude* is a line segment drawn from a vertex of a triangle to the opposite side or opposite side extended such that the line segment is perpendicular to the opposite side. In $\triangle ABC$, CD is an altitude. $AB = 16$ cm, $AC = 12$ cm and $CD = 6$ cm. An altitude is drawn from B to AC extended intersecting at E. Determine the length of BE.



Solution

The area of a triangle is determined using the formula $base \times height \div 2$. The height of the triangle is the length of an altitude and the base of the triangle is the length of the side to which a particular altitude is drawn.

$$\begin{aligned}
\text{Area } \triangle ABC &= \frac{(CD) \times (AB)}{2} \\
&= \frac{6 \times 16}{2} \\
&= 48 \text{ cm}^2 \\
\text{But, Area } \triangle ABC &= \frac{(BE) \times (AC)}{2} \\
48 &= \frac{(BE) \times 12}{2} \\
48 &= 6 \times BE \\
8 \text{ cm} &= BE
\end{aligned}$$

Therefore, the length of altitude BE is 8 cm.