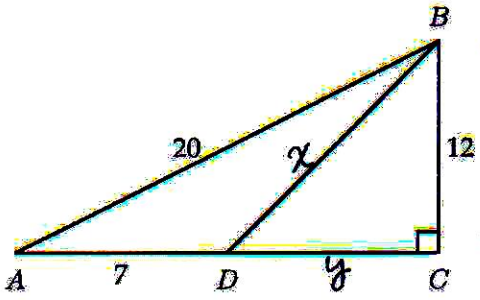
4. Find BD if C is a right angle, $BC = 12$, $AB = 20$, and $AD = 7$.



Let $x = BD$, $y = DC$

In $\triangle ABC$: $AC^2 + 12^2 = 20^2$ (Pythagorean Theorem)

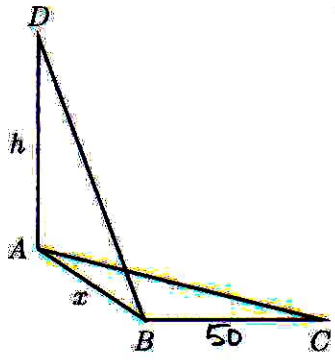
$AC^2 = 400 - 144 = 256$

$AC = 16 = 7 + y \Rightarrow y = 9$.

In $\triangle BDC$: $x^2 = 12^2 + y^2 = 12^2 + 9^2 = 144 + 81 = 225$

$x = \boxed{15}$

5. In a 3-dimensional space as shown below, $\angle ABD = 65°$, $\angle ACB = 55°$, $\angle ABC = \angle DAB = 90°$ and $BC = 50$ ft. Find x and then h.



In $\triangle ABC$: $\frac{x}{50} = \frac{Opp(55°)}{Adj(55°)} = \tan 55° \sim 1.4281$

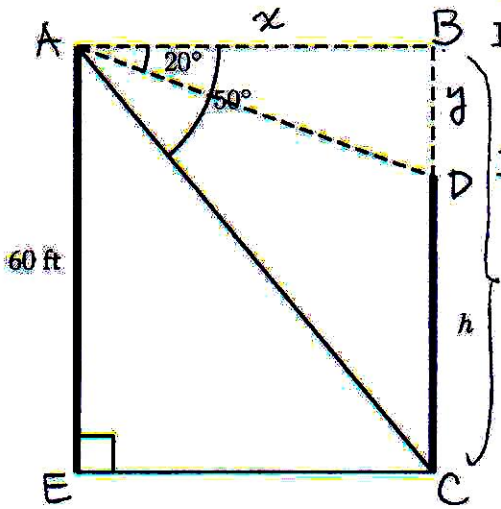
$x \sim 50(1.4281) \sim \boxed{71.4074}$

In $\triangle ADB$: $\frac{h}{x} = \frac{h}{71.4074} = \frac{Opp(65°)}{Adj(65°)} = \tan 65° \sim 2.1445$

$h \sim (71.4074)(2.1445)$

$\sim \boxed{153.1337}$

6. A man standing on the roof of a building 60.0 feet high looks down to the building next door. He finds the angle of depression to the roof of that building from the roof of his building to be 20°, while the angle of depression from the roof of his building to the bottom of the building next door is 50°. How tall is the building next door?



Let $x = AB$, $y = BD$. We also know $BC = AE = 60$ ft

In $\triangle ABC$: $\frac{x}{60} = \frac{Adj(50°)}{Opp(50°)} = \cot 50° = \frac{1}{\tan 50°} \sim 0.8391$

$x \sim 60(0.8391) \sim 50.3460$

In $\triangle ABD$: $\frac{y}{x} = \frac{y}{50.346} = \frac{Opp(20°)}{Adj(20°)} = \tan 20° \sim 0.3640$

$y \sim (50.346)(0.364) \sim 18.288$

$h + y = 60 \Rightarrow h = 60 - y$

$\sim 60 - 18.288$

$\sim \boxed{41.712}$ ft.