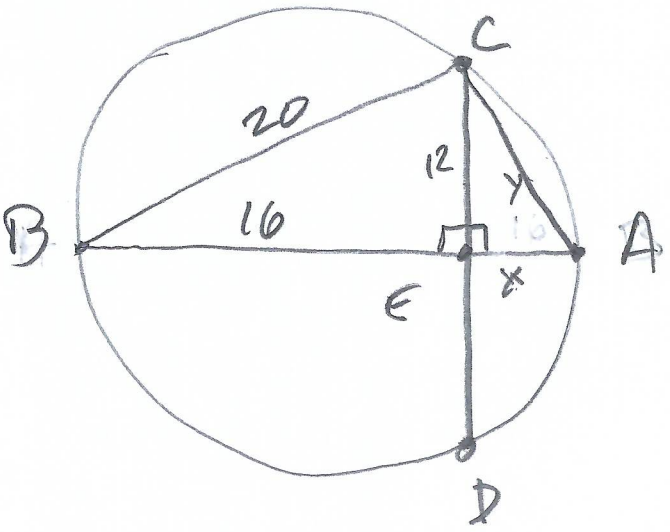
Holli #2

$\overline{AB}$ is a diameter

$\overline{AB}$ bisects $\overline{CD}$ at E.

This is a problem from the Veritas problem set.



By Prop III.3, $\angle BEC$ is right.

So, by I.47 (Pythagorean Thm), $BC = 20$.

Getting AE is harder. Let $x = AE$ and $y = AC$.

By Thales Theorem, $\angle BCA$ is right, so

$$x^2 + 20^2 = (x+16)^2 \quad \text{and} \quad x^2 + 12^2 = y^2$$

Thus $x^2 + 12^2 + 20^2 = x^2 + 32x + 16^2$

This gives $32x = 12^2 + 20^2 - 16^2$

so $2x = 9 + 25 - 16 = 18$

so $x = 9$.