Round 6

A) $MD = 6$ and $DN = 8$ → $MN = \sqrt{6^2 + 8^2} = 10$.

The area of $\triangle MDN$ is given by $\frac{1}{2} \cdot MD \cdot DN$ and $\frac{1}{2} \cdot MN \cdot DP$. Thus, $\frac{1}{2} \cdot 6 \cdot 8 = \frac{1}{2} \cdot 10 \cdot DP$

→ $DP = \underline{\textbf{4.8}}$

B) Let n denote the number of sides in the original polygon.

Then $\frac{(n+1)(n-2)}{2} - \frac{n(n-3)}{2} = 23$ → $-n - 2 + 3n = 46$ → $n = 24$ and $\frac{180(22)}{24} = \underline{\textbf{165}}$.

C) Let $FE = x$ and $DE = h$ Then:
$x^2 + h^2 = 15^2 = 225$ and $h^2 = 16x$
→ $x^2 + 16x = 225$ → $x^2 + 16x - 225 = (x - 9)(x - 25) = 0$
→ $x = 9$ → $AB = CE = 25$
Applying the Pythagorean Theorem or using Pythagorean Triples, $BE = \underline{\textbf{65}}$

$BE^2 = 25^2 + 60^2 = 4225$ and $\sqrt{4225} = \underline{\textbf{65}}$
$(25, 60, \_\_) = 5(5, 12, 13)$ → $\underline{\textbf{65}}$