37.57 A pump running at $1750rpm$ delivers $250gpm$ and generates $150ft$ of head. What is the head generated by the pump after the impeller is trimmed by 25%, assuming the speed remains the same?

A. $84ft$

B. $113ft$

C. $150ft$

D. $267ft$

Use the Pump Affinity Laws for Impeller Diameter Change. Consider the original pump conditions as State 1 and pump attributes after modification as State 2. A 25% reduction in diameter retains 75% of the original diameter such that $\frac{D_2}{D_1} = 0.75$. The speed is unchanged and the volume flow rate is extra information. Selet the formula below and determine the head for the new conditions.

$$h_2 = h_1 \left(\frac{D_2}{D_1} \right)^2$$

$$h_2 = (150ft)\,(0.75)^2 = 84.4ft$$

Answer A