

**36.47** The flow of a centrifugal pump developing  $150ft$  of head is reduced from  $500gpm$  to  $300gpm$ . After the speed reduction, what is the head added by the pump?

- A.  $32ft$
- B.  $54ft$
- C.  $90ft$
- D.  $250ft$

Refer to the **Pump Affinity Laws**. For a change in speed, the change in volume flow rate is proportional to the change in speed. Calculate the ratio of the new speed to the old speed.

$$\frac{N_2}{N_1} = \frac{Q_2}{Q_1} = \frac{300gpm}{500gpm} = 0.6$$

The change in head is a function of the *square* of the change in speed. Calculate the new head after the speed change.

$$\frac{h_2}{h_1} = \left(\frac{N_2}{N_1}\right)^2$$
$$h_2 = h_1 \left(\frac{N_2}{N_1}\right)^2 = (150ft)(0.6)^2 = 54ft$$

**Answer B**