

90. (a) The equation of continuity is $A_1 v_1 = A_2 v_2$ where $A_1 = \pi r_1^2$ and $A_2 = \pi r_2^2 = \pi (r_1/2)^2$. Consequently, we find $v_2 = 4v_1$.

(b) $\Delta(\frac{1}{2}\rho v^2)$ is equal to

$$\frac{1}{2}\rho(v_2^2 - v_1^2) = \frac{1}{2}\rho(16v_1^2 - v_1^2) = \frac{15}{2}\rho v_1^2 \quad .$$