

Question 19061

Let $F_1 = 405 \text{ N}$, $\varphi = 35.2 \text{ degrees}$.

While accelerating from zero velocity to given velocity, $m \frac{v^2}{2} = F_1 \cos \varphi a \frac{t^2}{2} = F_1 \cos \varphi \frac{vt}{2}$. Also,

from the 2nd Newtons law: $p = mv = t \cdot F_1 \cos \varphi \Rightarrow t = \frac{F_1 \cos \varphi}{p}$. Plugging this into first equation

gives: $\frac{mv^2}{2} = F_1^2 \frac{\cos^2 \varphi}{2m} \Rightarrow p = mv = F_1 \cos \varphi = 330 \text{ m/s}$.