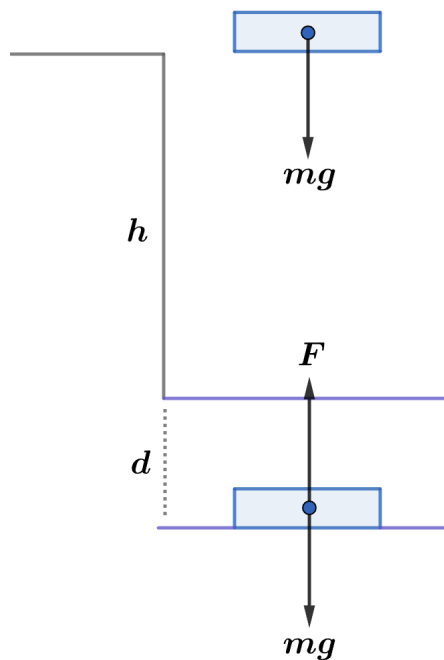# 2016 F=ma Exam: Problem 3

Kevin S. Huang

There is no net work done on the textbook since it starts at rest and ends at rest. Gravity does work

$$W_g = mg(h + d)$$

while the snow does work

$$W_s = -Fd$$

Since $W_{\text{tot}} = 0$,

$$W_g + W_s = mg(h + d) - Fd = 0$$

Solving for the retarding force F,

$$F = \frac{mg(h + d)}{d} = \frac{(5\,\text{kg})(10\,\text{m/s}^2)(3\,\text{m} + 1\,\text{m})}{1\,\text{m}} = 200\,\text{N}$$

so the answer is $\boxed{\text{E}}$.