P #40

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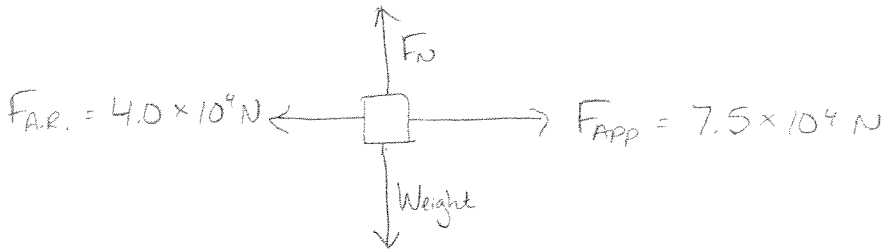
$m = 1.5 \times 10^4$ kg

$v_1 = 60$ m/s
$v_2 = ?$
$F_{App} = 7.5 \times 10^4$ N
$F_{A.R.} = 4.0 \times 10^4$ N

$d = 500$ m



$F_{net} = (7.5 \times 10^4 N) - (4.0 \times 10^4 N)$
$= 35{,}000$ N

$$KE_1 + W_{net} = KE_2$$

$$\frac{1}{2} \cdot m \cdot v_1^2 + F_{net} \cdot d = \frac{1}{2} \cdot m \cdot v_2^2$$

$$\frac{1}{2}(1.5 \times 10^4 \text{ kg}) \cdot (60 \text{ m/s})^2 + (35000 \text{ N}) \cdot (500 \text{ m}) = \frac{1}{2}(1.5 \times 10^4 \text{ kg}) \cdot v_2$$

$$4.45 \times 10^7 \text{ J} = \frac{1}{2}(1.5 \times 10^4 \text{ kg}) \cdot v_2^2$$

$$\boxed{v_2 = 77 \text{ m/s}}$$