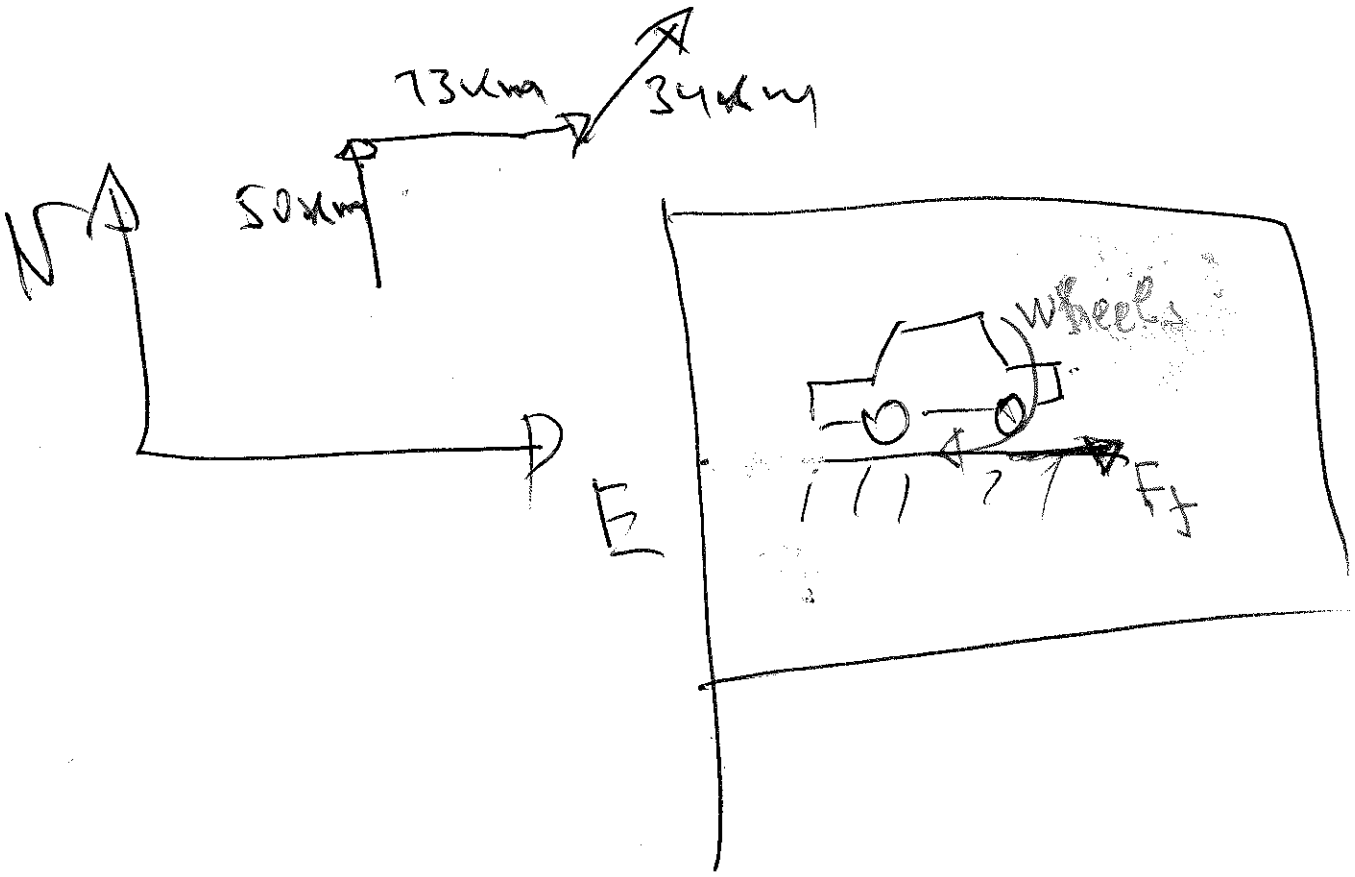
A car drives 50 km north, then 73 km east, then 34 km northeast, all at a constant velocity. If the car had to perform 230×10^6 J of work during this trip, what was the magnitude of the average frictional force on the car?

$$W = \text{Force}_{(f)} * \text{distance traveled}$$

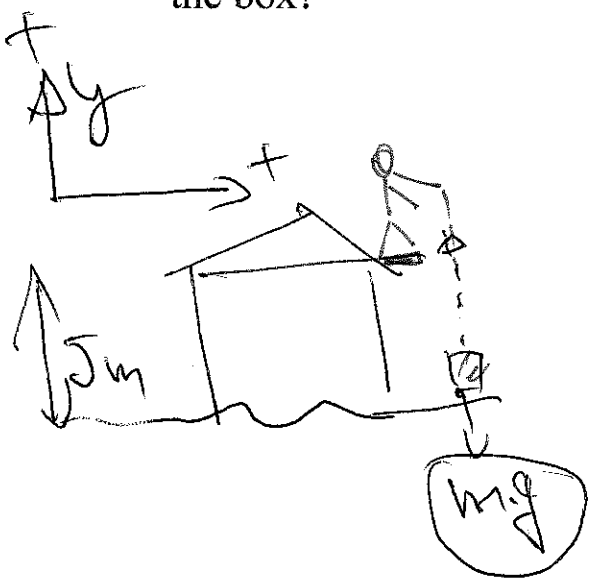
$$W/\text{distance traveled} = \text{Force}_{(f)}$$

$$230*10^6 / (50*10^3 + 73*10^3 + 34*10^3) = \text{Force}_{(f)}$$

$$1.65*10^3 \text{ N} = \text{Force}_{(f)}$$



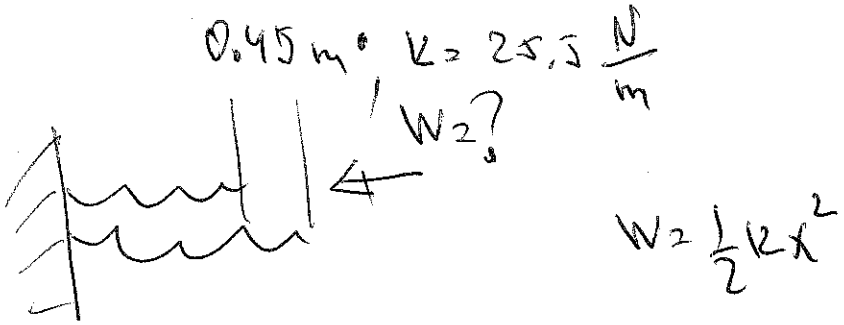
Boy does 400 J of work while pulling a box from the ground up to the roof of his house. The roof is 5 m above the ground. What is the mass of the box?



$W_g = m.g.\Delta y$

$m = W_g/(g.\Delta y)$

$= 400\ J\ /(9.82*5) = 8.14\ kg$



46. ORGANIZE AND PLAN Equation 5.8 gives the work done stretching (or compressing) a spring.

Known: $k = 25.5$ N/m; $x = 0.450$ m.

SOLVE Insert our known values in Equation 5.8:

$$W = \frac{kx^2}{2} = \frac{(25.5\text{ N/m})(0.450\text{ m})^2}{2} = 2.58\text{ J}$$

REFLECT This is a fairly soft spring.

Example: Object → $V = 2\ \frac{m}{s}$

$m = 3\,kg$

$$K = \frac{1}{2}mv^2 = \frac{1}{2}(3\,kg)\left(2\ \frac{m}{s}\right)^2 = 6\,kg \cdot \frac{m^2}{s^2} = 6\,J$$