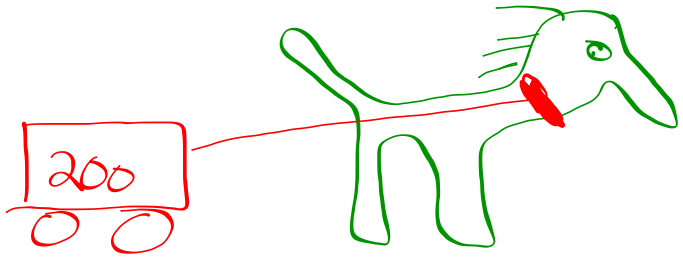
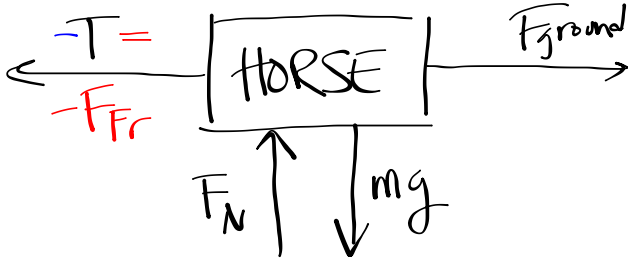
3. How much work did a horse do that pulled a 200-kg wagon 80 km without acceleration along a level road if the effective coefficient of friction was 0.060?

→ 80,000m



$W = \frac{1}{2}mv^2 - \frac{1}{2}mv^2 = 0$ Same

to the cart...



$\Sigma F = ma = 0$

$-F_{Fr} + T = 0$

$T = F_{Fr}$

$F_{Fr} = \mu F_N$

$= 0.06 \cdot (200)(9.8)$

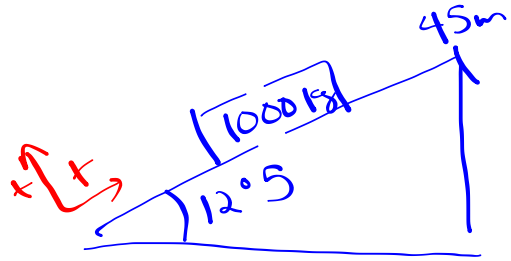
$= 117.6\,N$

$W = F \times d$

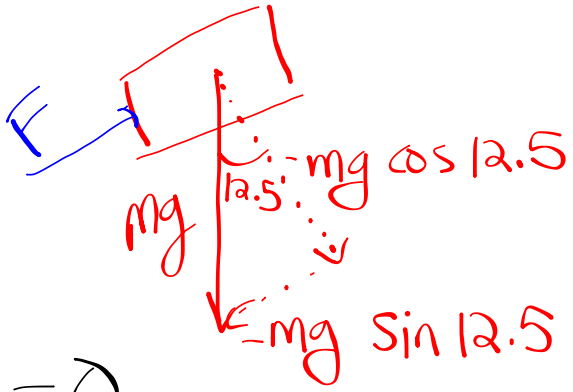
$= 117.6 \times 80{,}000$

$= 9{,}408{,}000\ J$

5. What is the minimum work needed to push a 1000-kg car 45.0 meters up a 12.5° incline?
   a) Ignore friction.
   b) Assume the effective coefficient of friction is 0.30.



Work → change KE



Vehicle has $a = 0$

$\Sigma F = ma = 0$

$F + -mg\sin 12.5 = 0$

$F = (1000)(9.8)(\sin 12.5) = 2121\ N$

$W = F \times d = 2121 \times 45$

$= 95455\ J$