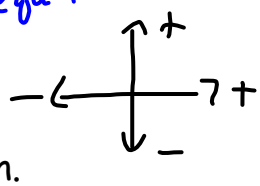
A 62 kg crate is pulled at a constant velocity with an applied force of 337 N.

a. Calculate the force of friction.
b. Calculate the normal force on the crate.
c. Calculate the coefficient of kinetic friction.

$F_{net} = 0\,N$, equilibrium.



a) $F_{net} = \Sigma \text{Force}$

$F_{net} = F_a + F_f$

$m = 62\,kg$

$F_a = 337\,N$

$F_{net} = 0\,N$

$0 = 337 + F_f$

$\boxed{-337 = F_f}$

b) $F_N = ?$

$|F_N| = |F_g| = |mg|$

Keep everything positive

$|F_N| = |mg|$

$= (62)(9.81)$

$\boxed{F_N = 608\,N}$

c) $\mu = ?$

$|F_f| = \mu |F_N|$ ← magnitude only

$337 = \mu(608)$

$\frac{337}{608} = \mu_K$ ← kinetic friction

$\boxed{0.55 = \mu_K}$

A box has a weight of 625 N and is being pulled with a net force of 12 N. The coefficient of kinetic friction is 0.23.

a. What is the mass of the box?

b. What is the force of friction?

c. What is the applied force?

$F_g = -625\ N$

$F_{net} = 12\ N$

$\mu = 0.23$

a) $m = ?$

$F_g = mg$

$-625 = m(-9.81)$

$\frac{-625}{-9.81} = m$

$63.7\ kg = m$

b) $F_f = ?$

$|F_f| = \mu F_N$

* F_N = weight = mg or F_g

$F_N = |F_g|$

$|F_f| = (0.23)(625)$

$|F_f| = 143\ N$

c) $F_a = ?$

$F_{net} = \sum$ Forces

$F_{net} = F_a + F_f$

$12 = F_a + (-143)$

↑ opposite direction of motion

$155\ N = F_a$

Attachments

forces-and-motion-basics_all.jar

forces-1d_all.jar

friction_en.jar