1. 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.

a) $F_f = \mu F_N$

$F_{net_x} = F_f + F_a$

$F_a = 337\ N$

$F_{net_x} = 0\ N$

$0 = F_f + 337$

$-337\ N = F_f$

b) $F_N = F_g = mg$ ←

$F_f = \mu F_N$

$F_N = (62 kg)(9.81 m/s^2)$

$F_N = 608\ N$

c) $F_f = \mu F_N$ ← use magnitudes (+ numbers)

$337 = \mu(608)$

$\frac{337}{608} = \mu$

$0.55 = \mu$

2. 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 ~~sled~~ box?

b. What is the force of friction?

c. What is the applied force?

a) $\text{Weight} = F_g = mg$

$625\,N = m(9.81\,m/s^2)$

$\frac{625\,N}{9.81\,m/s^2} = m \rightarrow \boxed{63.7\,kg = m}$

b) $F_{net_x} = F_f + F_a$

$F_f = \mu F_N$ ⊗ $F_N = F_g$

$F_f = (0.23)(625\,N) = \boxed{144\,N}$

c) $F_a = ?$

$F_{net_x} = F_f + F_a$ ← F_f always negative! (opposite direction)

$12\,N = -144\,N + F_a$

$\boxed{156\,N = F_a}$