Physics 432
Friction Practice Problems

Name: _____
Date: _____ Hr. _____

1. A pulling force of 10 N is applied horizontally and to the right to the box shown below. The coefficient of kinetic friction $\mu_{,K}$, is 0.2. Draw the FBD below and determine the acceleration of the 5 kg box.

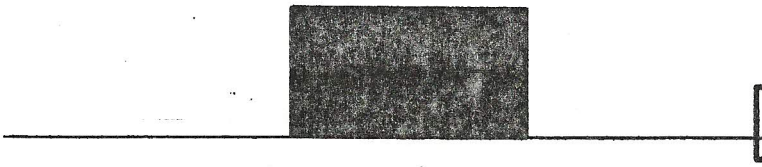
Accel =

2. A pulling force of 10 N is applied horizontally and to the right to the box shown below. The acceleration of the 5 kg box is 0.4 m/s/s to the right. Draw the FBD below. Determine the frictional force, F_f, and the coefficient of kinetic friction $\mu_{,K}$.

F_f =

$\mu_{,K}$ =

3. A frictional force of 6 N is acts upon the box below horizontally and to the left. The acceleration of the 5 kg box is 0.4 m/s/s to the right. Draw the FBD below. Determine the pulling force, F, and the coefficient of kinetic friction $\mu_{,K}$.



$\mu_{,K}$ =

F =

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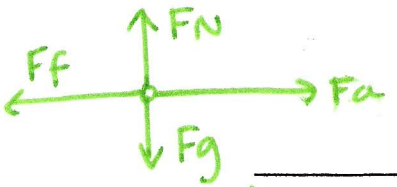
1. A pulling force of 10 N is applied horizontally and to the right to the box shown below. The coefficient of kinetic friction μ_K, is 0.2. Draw the FBD below and determine the acceleration of the 5 kg box.

Accel = .04 m/s²

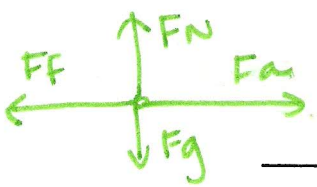


$F_f = \mu_K F_N$
$F_f = (.2)(49N)$
$F_f = 9.8N$

Y
$F_{net} = F_N - F_g$
$0 = F_N - m(9.8 m/s^2)$
$0 = F_N - (5kg)(9.8 m/s^2)$
$0 = F_N - 49N$ $F_N = 49N$

X
$F_{net} = F_a - F_f$
$ma = 10N - 9.8N$
$(5kg)a = .2N$
$a = .04 m/s^2$

2. A pulling force of 10 N is applied horizontally and to the right to the box shown below. The acceleration of the 5 kg box is 0.4 m/s/s to the right. Draw the FBD below. Determine the frictional force, F_f, and the coefficient of kinetic friction μ_K.



$F_f = \mu_K F_N$
$8N = \mu_K (49N)$
$\mu_K = .163$

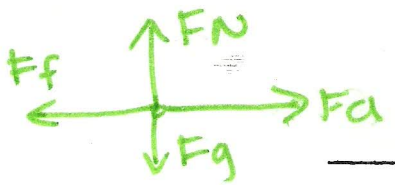
$F_N = F_g$ (see above)
$F_N = (5kg)(9.8 m/s^2)$
$F_N = 49N$

X
$F_{net} = F_a - F_f$
$ma = 10N - F_f$
$(5kg)(.4 m/s^2) = 10N - F_f$
$F_f = 8N$

$F_f = 10N - 2N$

F_f = 8N
μ_K = .163

3. A frictional force of 6 N is acts upon the box below horizontally and to the left. The acceleration of the 5 kg box is 0.4 m/s/s to the right. Draw the FBD below. Determine the pulling force, F, and the coefficient of kinetic friction μ_K.



$F_f = \mu_K F_N$
$6N = \mu_K (49N)$
$\mu_K = .122$

$F_N = F_g$ (see above)
$F_N = m(9.8 m/s^2)$
$F_N = (5kg)(9.8 m/s^2)$
$F_N = 49N$

X
$F_{net} = F_a - F_f$
$ma = F_a - 6N$
$(5kg)(.4 m/s^2) = F_a - 6N$
$2N + 6N = F_a$
$F_a = 8N$

μ_K = .122
F = 8N