1. Static (Fs) or Kinetic (Fk) Friction?

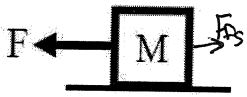
K Tries to stop an object when it's moving.
K How much force to keep an object sliding.
K Slows down a sliding object.
S How much it takes to start an object sliding.
K Car tires when they "spin out".
both Requires F_N to calculate.
K Calculate with μ_k.
K On a playground slide.
K Sliding friction.
S Car tires normally.
S Is greater.
S Gripping friction
S Calculate with μ_s.

2. More or less friction?

A. M On a rougher surface.
B. M If F_N increases.
C. L If the surface is smoother.
D. L If μ is less.
E. M If the object has more mass.
F. M If you push down on the object.
G. L If you pull up on the object.
H. M If μ increases.

3. An object is moving to the left. Which way does friction act? Right

4. A force is pulling on an object to the left. Draw an arrow showing the direction of static friction.



5. If F_N = 50 N and μ_s = .26, find the force of static friction.

$F_S = \mu \cdot F_N$

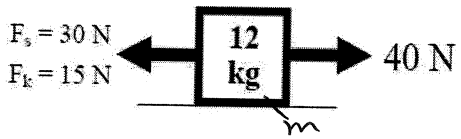
$.26 \cdot 50N = \boxed{13N}$

6. If F_N = 25 N and μ_k = .13, calculate kinetic friction.

$F_K = \mu \cdot F_N$

$.13 \cdot 25N = \boxed{3.25N}$

7. A. How much force is necessary to start the 12 kg object moving? 30N+
B. How much force is necessary to keep it moving? 15N
C. If it starts at rest, will it start sliding? Yes $F_S = 30 < F = 40N$

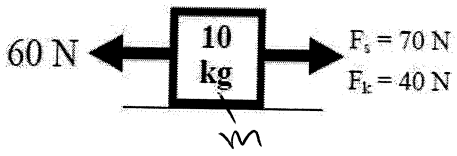


D. Calculate the acceleration of the object.

$F_{net} = ma$ $\quad a = \frac{F_{net}}{m}$ $\quad a = \frac{25N}{12kg} = \boxed{2.1 m/s^2}$

$F_{net} = 40N - 15N = 25N$

8. A. Does the object start sliding? No
B. If not, how much extra force is necessary? 10N+
C. If it is moving calculate the acceleration of the object?

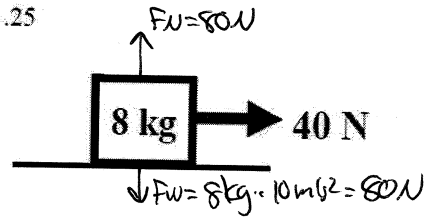


$F_{net} = -20N$

$a = \frac{F}{m}$ $\quad \frac{-20N}{10kg}$ $\quad \boxed{a = -2 m/s^2}$

$F = ma$

$\mu_s = .4$ $\quad \mu_k = .25$



9. A. Calculate the normal force on the object.
B. Calculate both static and kinetic friction.

$F_S = .4 \cdot 80N = 32N$

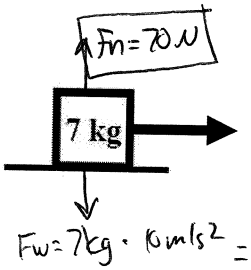
$F_K = .25 \cdot 80N = 20N$

C. Does the object start moving? Yes 32N < 40N
D. Calculate the acceleration if it is moving.

$F = ma$ $\quad F_{net} = 40N - 20N = 20N$

$a = \frac{F}{m}$ $\quad \frac{20N}{8kg} = \boxed{2.5 m/s^2}$

$\mu_s = .6$ $\quad \mu_k = .3$



10. A. Calculate F_N.

B. Using F_N, calculate F_s and F_k.

$F_S = .6 \cdot 70N = \boxed{42N}$ $\quad F_K = .3 \cdot 70N = \boxed{21N}$

C. Will the object slide? No $F_S > F$
D. Calculate the acceleration of the object if it does slide.

$F = ma$ $\quad F_{net} = 40N - 21N = 19N$

$a = \frac{F_{net}}{m}$ $\quad \frac{19N}{7kg} = \boxed{2.7 m/s^2}$