Announcements

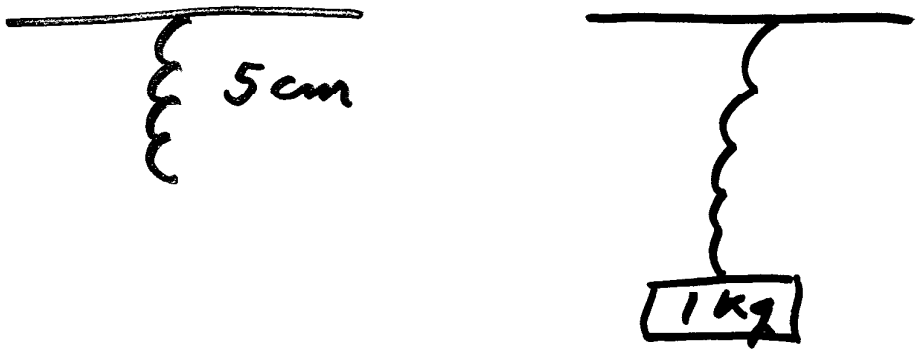
NO class monday

H.w Due today

HITT (clicker) points on webct

Read 3.1 - 3.2 for wednesday

A spring of Relaxed length is 5cm. It has a spring constant $k = 5.0\ N/cm$. A mass of 1 kg is attached to the spring. How far does it stretch?



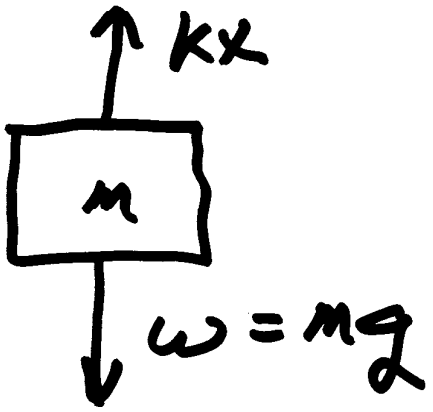
TO SOLVE

NEED TO KNOW ABOUT

- SPRING
- ADDING VECTORS
- WEIGHT

Solve

solve



$F = kx$

$\Sigma \vec{F} = 0$

$\vec{F}_{spring} + \vec{F}_{gravity} = 0$

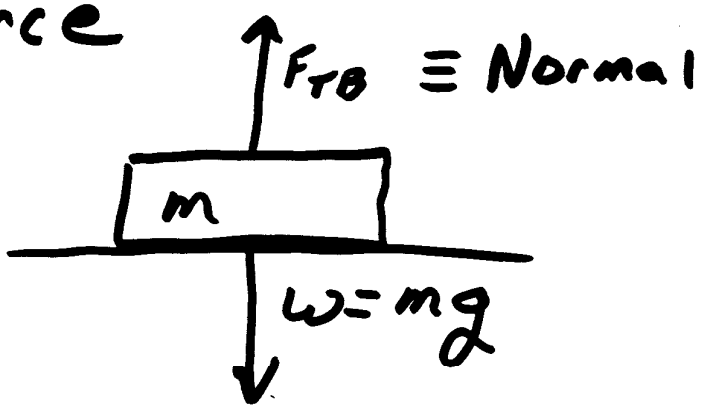
$+kx - mg = 0$

$x = \frac{mg}{k}$

$x = \frac{1kg \cdot 9.8 m/s^2}{5 N/cm} = \boxed{2 cm}$

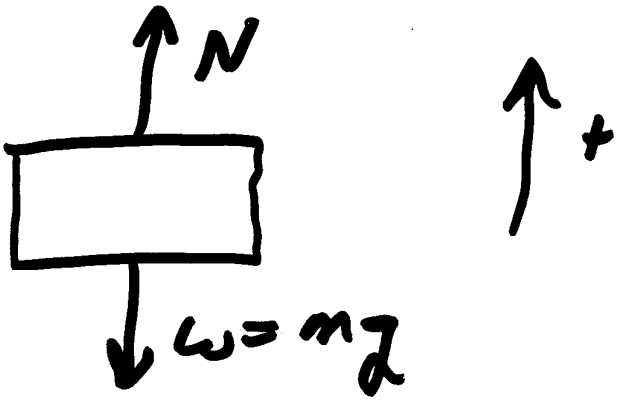
Normal force

Book on table



Normal force <u>always</u> perpendicular to contact surface

what is normal force for a book lying on a flat surface? Book has a mass 0.8 kg



$$\vec{N} + \vec{w} = 0$$

$$N - w = 0$$

$$N = w = mg = (.8\,kg)(9.8\,m/s^2)$$

$$= \underline{7.84\,N}$$

A normal force of a book on a table is always

- A) Perpendicular to the surface of the table
- B) Parallel to the surface of the table
- C) Equal to the book's weight
- D) A & C
- E) B & C

Now tie a string on book and pull with a force of 5.0 N.

What is the normal force?

$$\vec{F}_S + \vec{F}_N + \vec{w} = 0$$

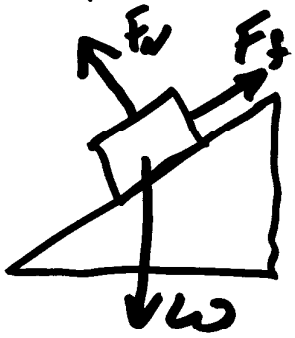
$$+F_S + F_N - w = 0$$

$$F_N = w - 5.0\,N$$

$$= (0.18\,kg \times 9.9\,m/s^2) - 5.0\,N$$

$$F = 2.84\,N$$

A Block on an inclined plane



$\vec{F}_N + \vec{W} + \vec{F}_f = 0$

$\vec{F}_f \equiv$ 2 types

static friction → object not moving

$F_{max} = \mu_s F_N$ ← normal force

↑ coefficient of static friction

$F_s \leq \mu_s F_N$

once object moves

kinetic friction

$F_k = \mu_k F_N$

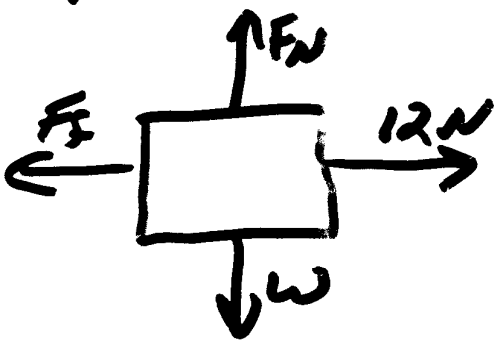
↑ coefficient of kinetic friction

A 3.0 kg block is at rest on a horizontal floor. You push horizontally on the 3.0 kg block with a force of 12 N and it just starts to move.

a) What is coefficient of static friction?

b) Place a 7 kg block on top. What force is required to just make blocks move?

#35 in book



$F_N = w$

μ_s

$F_{max} = \mu_s F_N \Rightarrow \mu_s = \frac{12N}{w} = \frac{12N}{mg}$

12N

$= \frac{12N}{(3kg)(9.8 m/s^2)} = \boxed{.41}$

b) $\Rightarrow m = 10\,kg$

$F_{max} = \mu_s F_N = (.41)(mg)$

$= (41)(10\,kg)(9.8 m/s^2)$

$\boxed{= 40N}$

Block of $w = mg = 10\,N$ on a horizontal surface. $\mu_s = 0.5$; $\mu_k = 0.1$

a) I apply a force of 8 N. What is the acceleration of the block?

b) If I apply force = 4 N, is acceleration $\frac{1}{2}$ of that found in a)?