Forces on an Incline

Name: Notes 12/1

When an object is on an incline and sliding down, we will try to determine how fast it will be sliding down the incline.

There are steps you must take to find out how fast the object is moving down the incline.

1.) Find the object's weight

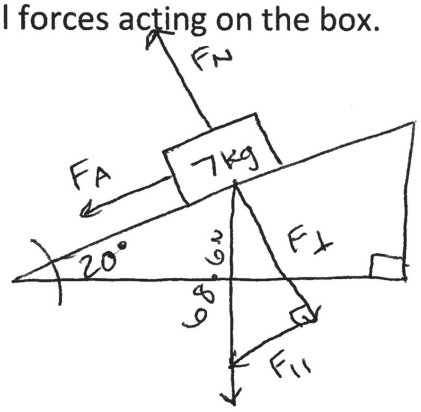
2.) Break down Fw into parallel and perpendicular components

3.) Angle of ramp = Angle of right triangle you made from Fw

4.) Use sine and cosine to find magnitude of the component vectors

Now that the object is on an incline, there are new things we need to remember....
The perpendicular force is the same as the normal force.
The parallel force is the net force.

Example #1:
A 7kg box is resting on a frictionless surface at a 20° incline. Draw a free body diagram that shows all forces acting on the box.



Weight: 68.6N

Perpendicular force: 64.5N

Parallel force: 23.5N

Normal force: 64.5N

Acceleration: 3.35 m/s²

① $F_w = mg$
$F_w = (7kg)(9.8 m/s^2)$
$F_w = 68.6N$

② $F_\perp = F_w \cos\theta$
$F_\perp = 68.6N \cos 20°$
$F_\perp = 64.5N$

③ $F_{||} = F_w \sin\theta$
$F_{||} = 68.6N \sin 20°$
$F_{||} = 23.5N$

④ $F_{net} = ma$
$\frac{23.5N}{7} = \frac{7kg(a)}{7}$
$3.35 m/s^2 = a$