4. (15 pts.) A block with mass m = 10kg is being pushed by a horizontal force $\vec{F}$ up a frictionless incline with a speed of 7m/s. The angle of the incline is $\alpha = 30°$.

   a. (3 pts.) Draw a free body diagram showing all forces acting on the block. Be sure to label each force and show what coordinate system you will be using.

   b. (6 pts.) Find the magnitude of the applied force F.

   c. (6 pts.) Find the magnitude of the normal force F_n.

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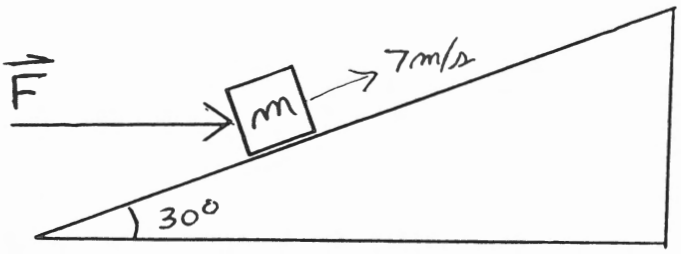
(see ch 4 # 41)
(T.Pla)



a. (3 pts.) Draw a free body diagram showing all forces acting on the block. Be sure to label each force and show what coordinate system you will be using.

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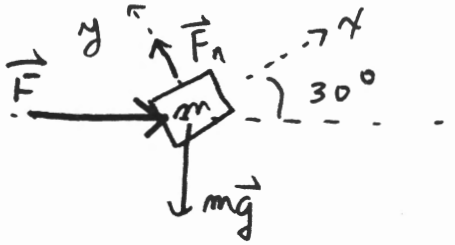
(a)



(b) x-component: $F\cos 30° - mg\sin 30° = ma_x$

$F\cos 30° - mg\sin 30° = 0$

$F = mg\tan 30° = \boxed{56.6\text{N}}$

(c) y-component: $F_n - F\sin 30° - mg\cos 30° = ma_y$

$F_n - F\sin 30° - mg\cos 30° = 0$

$F_n - 28.3\text{N} - 85.0\text{N} = 0$

$\boxed{F_n = 113\text{ N}}$