

Force at an angle - Polaris example.

A Polaris snowmobile is pulling a 200.0 kg sled to the right with 400. N at an angle of 22 degrees with the ground. If  $\mu = 0.11$  and the sled starts from rest find  $V_f$  after 4.0 s

$F_y = 400 \sin 22 = 149.8 \text{ N}$   
 $F_x = 400 \cos 22 = 370.9 \text{ N}$   
 $F_g = (200)(9.81) = 1962 \text{ N}$   
 $N = F_g - F_y = 1812.2 \text{ N}$   
 $f = \mu N = (0.11)(1812.2) = 199.34 \text{ N}$   
 $F_n = F_x - f = 370.9 - 199.34 = 171.56 \text{ N}$   
 $F_n = ma$   
 $a = \frac{F_n}{m} = \frac{171.56 \text{ N}}{200 \text{ kg}} = 0.86 \text{ m/s}^2$   
 $V_f = 0 + (0.86)(4.0) = 3.4 \text{ m/s}$

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