Pb 3 | Friction Practice

Warm Up

- A 65.0 kg skier is sliding down a 30.0° slope. Assume the coefficient of dynamic friction between her skis and the snow is 0.0900. Determine the following:
  - The force of friction acting on her as she slides on her skis
  - Her acceleration down the slope
  - How fast will she be going after 4.50 s?

$m = 65\,kg$

$\theta = 30°$

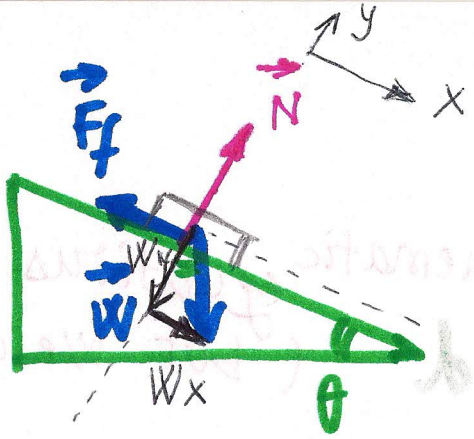
$\mu_d = 0.09$

$t = 4.53$

a) $F_f = ?$

b) $a = ?$

c) $v = ?$



a) $F_f = \mu_d \cdot N$

On y direction, the equilibrium condition

$N = W_y$

$W_y = W \cdot \cos\theta = m \cdot g \cdot \cos\theta$

$$F_f = \mu_d \cdot m \cdot g \cdot \cos\theta$$

b) Newton's 2nd Law of motion on X direction

$$F_{net\,x} = m \cdot a \Rightarrow a = \frac{F_{net\,x}}{m}$$

$$F_{net\,x} = W_x - F_f = m \cdot g \cdot \sin\theta - F_f$$

$$a = \frac{mg\sin\theta - F_f}{m} = g \cdot \sin\theta - \frac{F_f}{m}$$

c) $u = 0 \text{ m/s}$

$v = ?$

Kinematic equations (but we don't know the time

$v^2 = u^2 + 2a \cdot d$

$\boxed{v = u + a \cdot t}$ ← so we will use this equation