P #49

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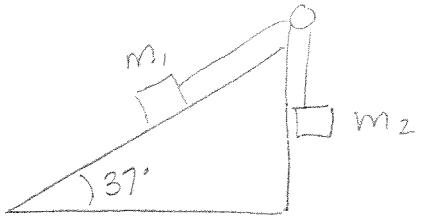
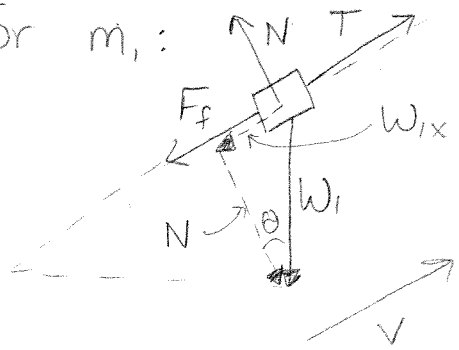
$m_1 = 7.0\,kg$
$m_2 = 12.0\,kg$

$W_1 = 68.6\,N$
$W_2 = 117.6\,N$

$\mu_K = .250$
$\theta = 37.0°$



For m_1:



Components of W_1:

$W_{1x} = W_1 \cdot \sin\theta = (68.6\,N)\cdot\sin 37$
$W_{1x} = 41.3\,N$

$N = W_1 \cdot \cos\theta = (68.6\,N)\cdot\cos 37°$
$N = 54.8\,N$

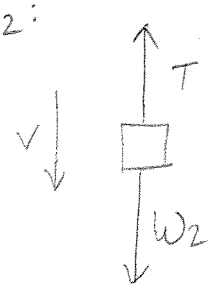
Calculate F_f: $F_f = \mu_K \cdot N$
$= (.25)(54.8\,N)$
$F_f = 13.7\,N$

Net force of m_1: $F_{net} = T - F_f - W_{1x} = m_1 \cdot a$

$= T - (13.7\,N) - (41.3N) = (7.0\,kg)\cdot a$

so $T = (55\,N) + 7\cdot a$

For m_2:



$F_{net} = W_2 - T = m_2 \cdot a$

$= 117.6N - T = 12.0a$

Substituting...
$117.6N - (55N + 7a) = 12a$ so $\boxed{a = 3.3\,m/s^2}$