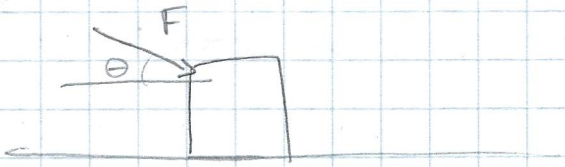
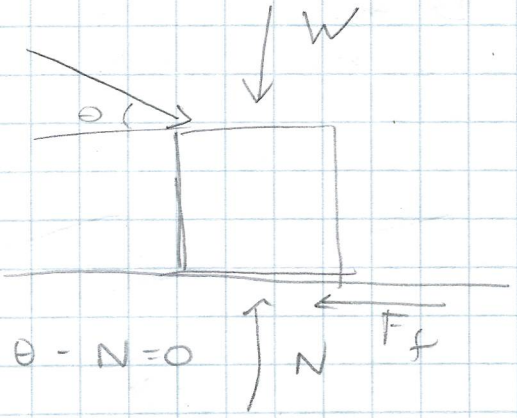
20-P-WE-AF-009

Power and Efficiency: Beginner

Q: A block of mass M kg is being pushed by a force $F = A$ N at angle of θ = theta to the horizontal for a total of $t = T$ s. What is the power generated? The crate starts at rest and the $\mu_k = U$.

A:





$+\uparrow \sum F_y = ma_y$; $\Rightarrow$ $0 = Mg + F\sin\theta - N = 0$

$N = Mg + F\sin\theta$

$\rightarrow \sum F_x = ma_x$; $F\cos\theta - UN = Ma$

$\Rightarrow$ $a = \dfrac{F\cos\theta - UN}{M}$

$v = 0 + a \cdot T$

$P = F_x \cdot v = F\cos\theta \cdot a \cdot T$

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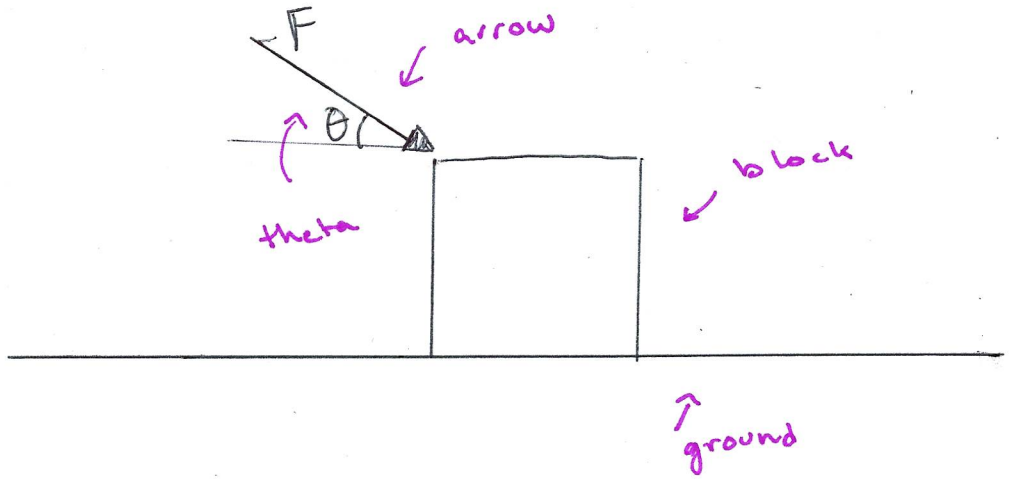
labelling



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