1. Two blocks 1 and 2, on a frictionless table, are pushed from the left by a horizontal force $F_1$ and on the right by a horizontal force of magnitude $F_2$ as pictured. The magnitudes of the pushing forces satisfy the inequality $|F_1| > |F_2|$.

Which of the following statements is true about the magnitude of the contact force, $N$, between the two blocks?

a) $N > |F_1| > |F_2|$
b) $|F_1| > N > |F_2|$
c) $|F_1| > N = |F_2|$
d) $|F_1| = N > |F_2|$
e) $|F_1| = |F_2| > N$
f) Cannot be determined from the information given.
(Part I) You push on a block of mass M with a horizontal force $F$ as shown in the figure below. A block of mass $m$ on top of M moves precisely along with it. What force directly causes $m$ to accelerate horizontally along with M?

a) The normal force between the blocks  
b) The static friction force between the blocks  
c) The kinetic friction force between the blocks  
d) The gravitational force on $m$  
e) The force that you apply on M  
f) No force is required because the masses are in contact

(Part II) What is the maximum magnitude of $F$ in order for $m$ to move along with M? How would kinetic friction on the surface under M change this?
2. If you’ve ever been on skis, you know that you can go dangerously fast if you just point your skis straight down the mountain and go as fast as possible. If a 70-kg skier is subjected to a pressure drag force $F_{\text{drag}} = \frac{1}{2} C_D \rho A v^2$, with $C_D = 0.5$, $\rho = 1.2 \text{ kg} \cdot \text{m}^{-3}$, and $A = 0.5 \text{ m}^2$, and is also subjected to a kinetic friction force with $\mu_k = 0.1$, calculate the terminal velocity for the skier on a slope that is inclined at $\theta = 30^\circ$ relative to the horizontal.