1. Give a brief summary of the laws of dry friction. (2)

2. The 30-lb block A and the 25-lb block B are initially at rest as shown, where \( \mu_s \) is 0.2 between all surfaces of contact. If the applied force \( P \) causes block A to have an impending motion down the incline, determine its magnitude \( P \). (8)

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2. FBD for block B (2)

\[ \pm \Sigma F_x = 0 : -\frac{4}{5} N_1 - \frac{3}{5} (0.2 N_1) + N_2 = 0 \]

\[ +\uparrow \Sigma F_y = 0 : \frac{3}{5} N_1 - \frac{4}{5} (0.2 N_1) - 0.2 N_2 - 25 = 0 \]

\[ N_1 = 97.65625 \text{ lb} \quad N_2 = 89.84375 \text{ lb} \ (2) \]

FBD for block A (2)

\[ \pm \Sigma F_x = 0 : \frac{3}{5} N_3 - \frac{4}{5} (0.2 N_3) + \frac{4}{5} P - N_2 = 0 \]

\[ +\uparrow \Sigma F_y = 0 : \frac{4}{5} N_3 + \frac{3}{5} (0.2 N_3) - \frac{3}{5} P + 0.2 N_2 - 30 = 0 \]

\[ N_3 = 63.53125 \text{ lb} \quad P = 77.3625 \text{ lb} \]

\[ P = 77.4 \text{ lb} \ (2) \]