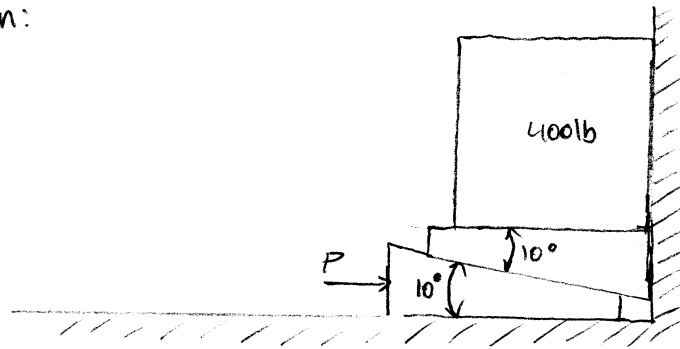


8.52

3131b →

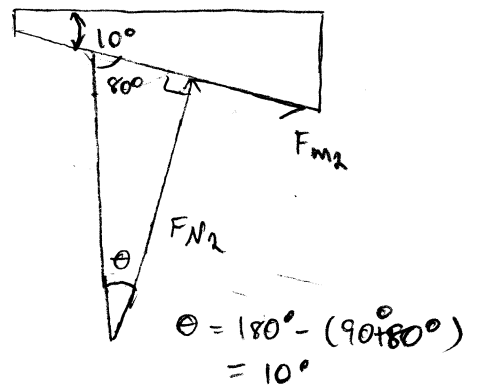
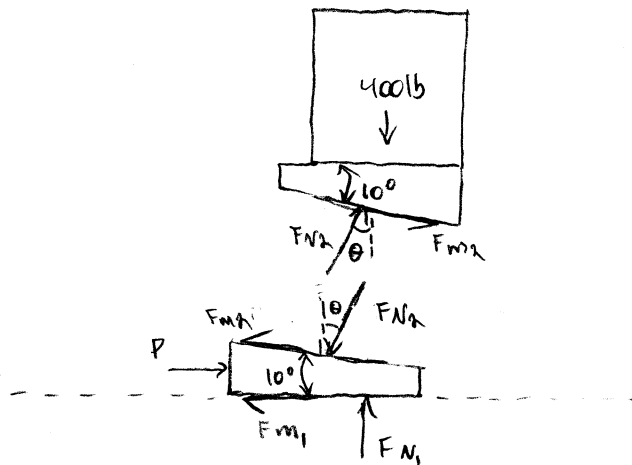
Given:



$$\mu_s = 0.25$$

Find: the smallest force P that should be applied as shown to one of the wedges.

Solution:

FBD

$$\theta = 180^\circ - (90^\circ + 80^\circ) = 10^\circ$$

consider the block

$$+\uparrow \sum F_y = 0, \quad -400 \text{ lb} + F_{N2} \cos(10) = 0, \quad F_{N2} = 406.1715$$

$$F_{f2} \cos(10) = (0.25)(406.1715) = 103.1015$$

consider the wedge

$$+\uparrow \sum F_y = 0, \quad F_{N1} - 406.1715 \cos(10) = 0, \quad F_{N1} = 400 \text{ lb}$$

$$F_{f1} = (0.25)(400 \text{ lb}) = 100 \text{ lb}$$

$$+\rightarrow \sum F_x = 0, \quad P - 103.1015 - 100 \text{ lb} - 406.1715 \sin(10) = 0$$

$$P = 273.15$$