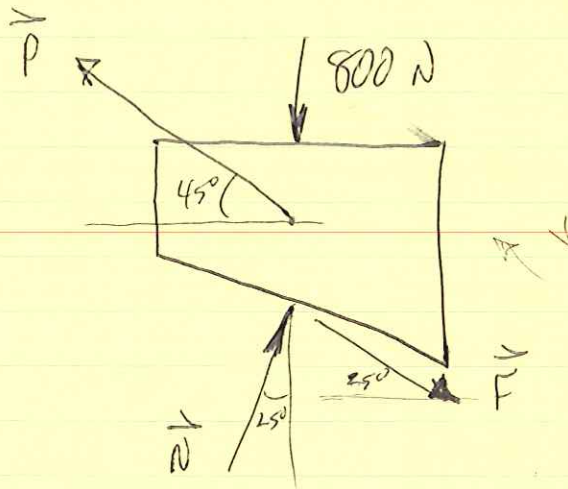


EXAMPLE PROB. 8.5

FBD: IMPENDING MOTION UP THE RAMP.



$$\sum F_x = 0: -P \cos 45^\circ + N \sin 25^\circ + F \cos 25^\circ = 0$$

$$F = F_{max} = \mu_s N = 0.2 N$$

$$-0.707 P + 0.423 N + (0.2 N)(0.906) = 0$$

$$P = 0.854 N$$

$$\sum F_y = 0: P \sin 45^\circ + N \cos 25^\circ - F \sin 25^\circ - 800 = 0$$

$$0.707 P + 0.906 N - (0.2 N)(0.423) - 800 = 0$$

$$0.707 P + 0.821 N = 800$$

$$0.707(0.854 N) + 0.821 N = 800$$

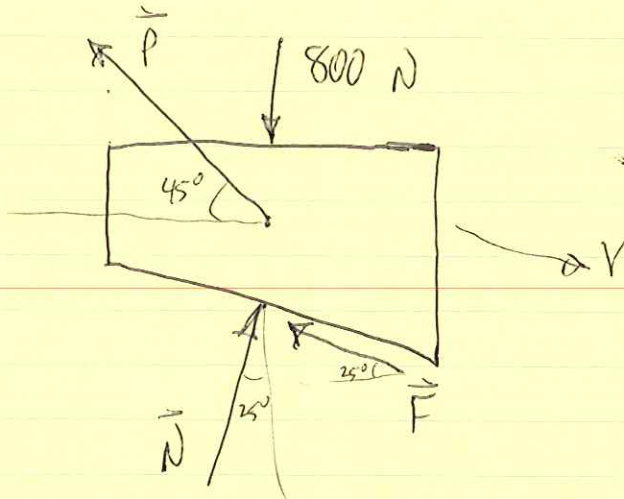
$$N = 561 N$$

$$P = 0.854(561 N) = 479 N$$

8.5

5

FBD: IMPENDING MOTION DOWN THE RAMP:



$$\sum F_x = 0: -P \cos 45^\circ + N \sin 25^\circ - F \cos 25^\circ = 0$$

$$-0.707 P + 0.423 N - (0.2 N)(0.906) = 0$$

$$P = 0.342 N$$

$$\sum F_y = 0: P \sin 45^\circ + N \cos 25^\circ + F \sin 25^\circ - 800 = 0$$

$$0.707 P + 0.906 N + (0.2 N)(0.423) = 800$$

$$0.707 P + 0.991 N = 800$$

$$0.707(0.342 N) + 0.991 N = 800$$

$$N = 649 \text{ N}$$

$$P = 0.342(649 \text{ N}) = 222 \text{ N}$$

$$222 \leq P \leq 479 \text{ N}$$