

Tipping Force Analysis

50 lb

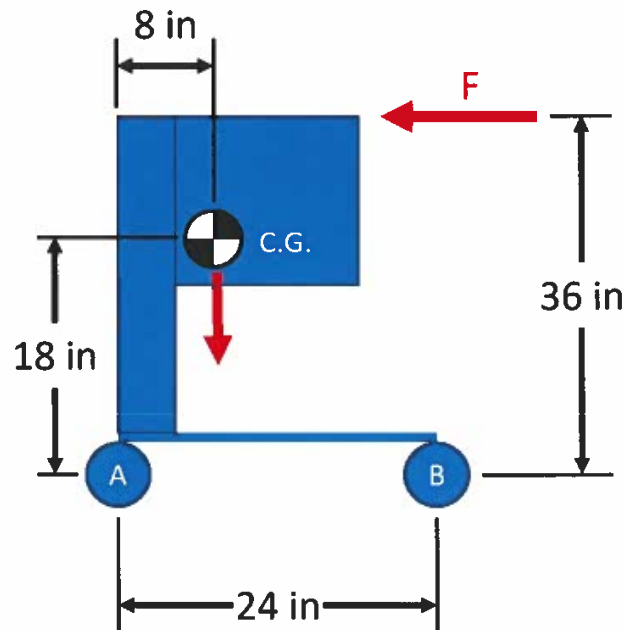


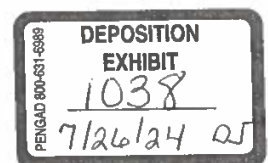
Figure 1

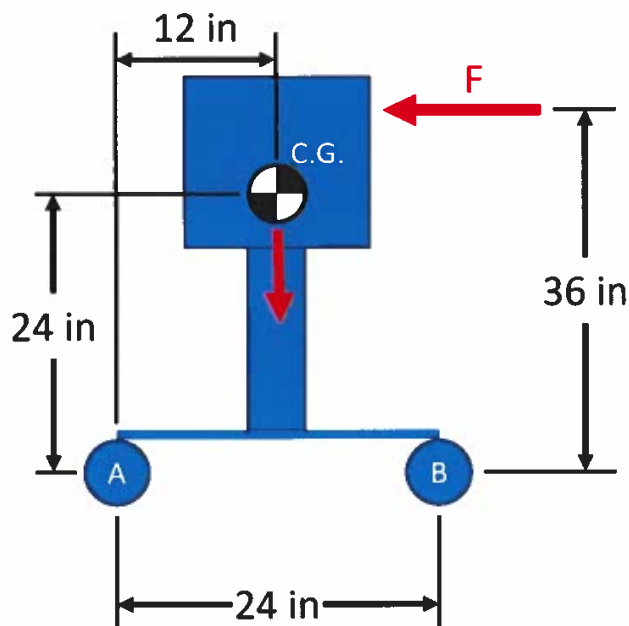
Figure 1 depicts a representation of a medical cart, along with its center of gravity. Let the weight of the cart be 50 lb. To find the force F required to tip the cart, we sum the moments about point A, assuming that point A will not move (for example, because of a small ledge or cable) and that the reaction force at B is zero. Then, we have

$$\sum M_A = 0 = F * (36 \text{ in}) - (50 \text{ lb}) * (8 \text{ in})$$

Solving for F gives

$$F = \frac{(50 \text{ lb}) * (8 \text{ in})}{36 \text{ in}} = 11.1 \text{ lb}$$





50 lb.

Figure 2

Figure 2 depicts a representation of another medical cart, along with its center of gravity. Let the weight of the cart be 50 lb. To find the force F required to tip the cart, we sum the moments about point A, assuming that point A will not move (for example, because of a small ledge or cable) and that the reaction force at B is zero. Then, we have

$$\sum M_A = 0 = F * (36 \text{ in}) - (50 \text{ lb}) * (12 \text{ in})$$

Solving for F gives

$$F = \frac{(50 \text{ lb}) * (12 \text{ in})}{36 \text{ in}} = 16.7 \text{ lb}$$

Thus, we see that the second cart requires a greater force to tip, and therefore is more stable.