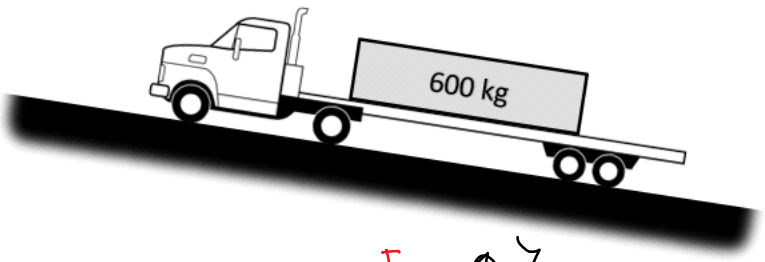
Problem 2

Force Method Two Dimensions (Practice Problem)

- A man in a flat bed truck starts from rest up a hill at an angle of 10 degrees. If he is carrying a 600 kg crate in the back and the static coefficient of friction is .3...
  - What is the maximum rate of acceleration before the crate slides off of the back of the truck?
  - How long will it take the truck to reach a speed of 25 m/s?



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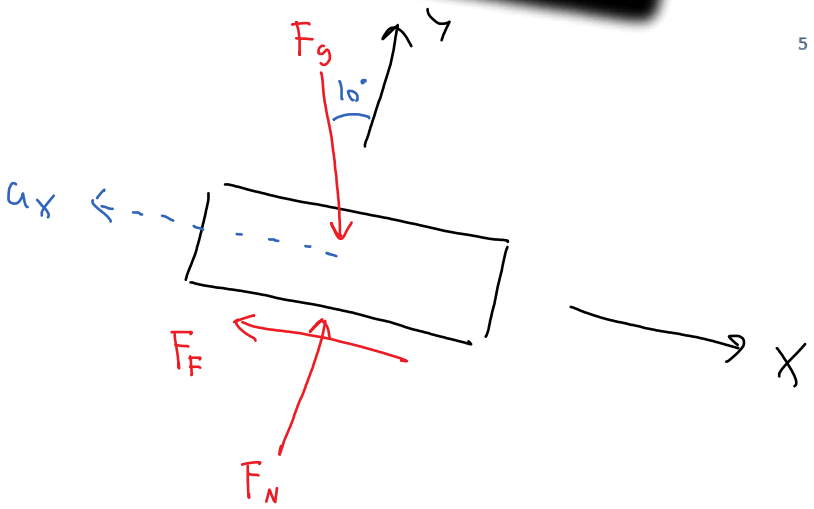

$$\sum F_x = -F_F + (600)(9.81)(\sin(10)) = (600)(-a_x)$$

$$\sum F_y = F_N - (600)(9.81)(\cos(10)) = 0$$

impending motion $F_F = .3F_N$

$$F_N = 5796.6\,N \rightarrow F_F = 1738.97\,N$$

$$a_x = \frac{(1738.97) - (600)(9.81)(\sin(10))}{600}$$

$$\boxed{a_x = 1.19 \text{ m/s}^2}$$

$$\downarrow$$

$$V(t) = 25 \text{ m/s} = a(t)$$

$$\boxed{t = 20.9 \text{ s}}$$