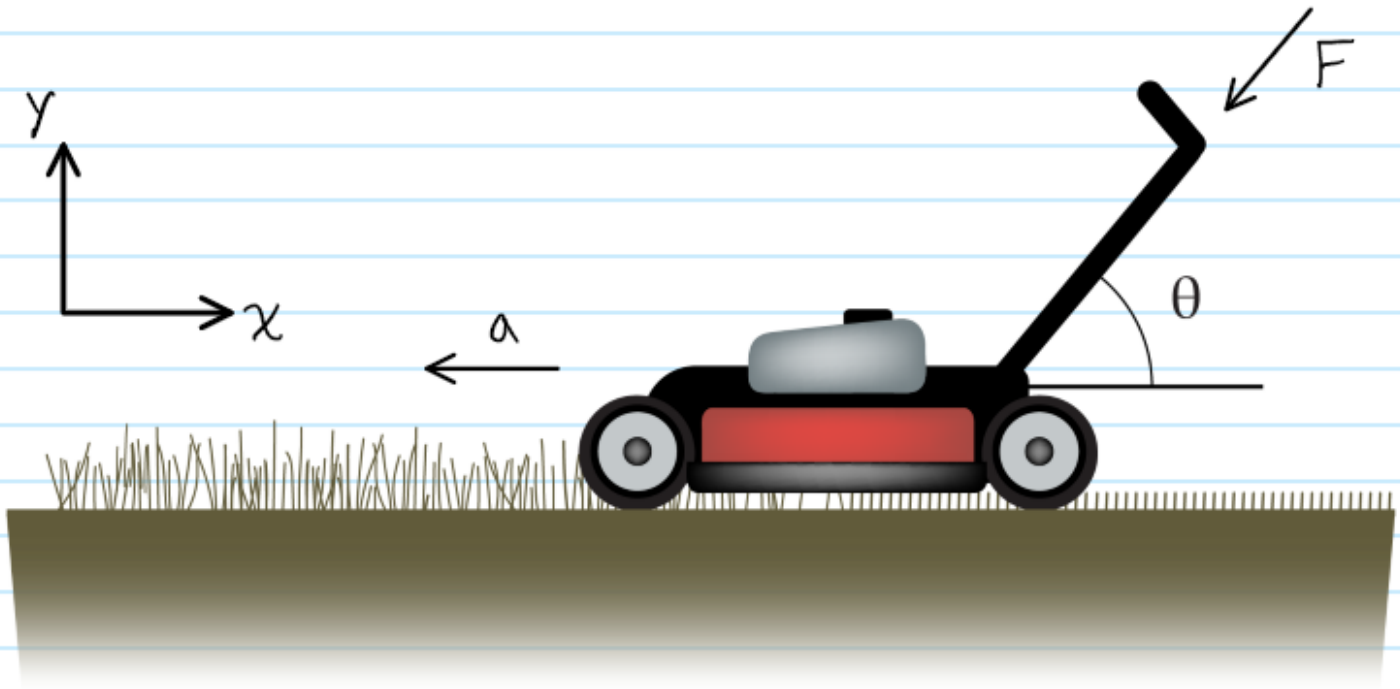
21-P-FA-GD-001



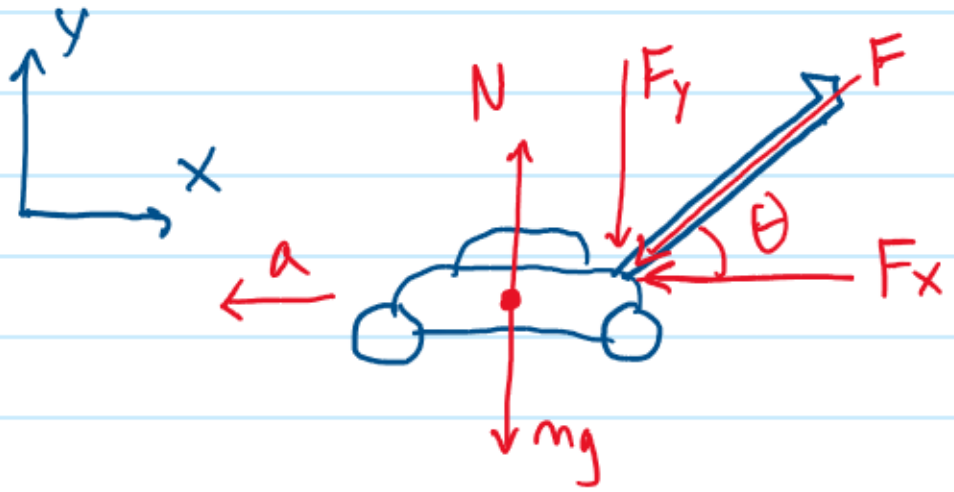
Its that time of year again... The grass on your lawn has grown and it needs to be cut.

To pass the time faster, you decide to do a physics problem in your head.

You are pushing your mower with a force of $\vec{F}$.
The mower has a mass of m and the mower handle extends at an angle of θ above the horizontal.

What is the normal force reaction?
What is the acceleration of the mower?

(Assume $g = 9.81\ m/s^2$ and ignore friction).



given
θ, F, m, g

find
N, a

break F into its x & y components

sign
$F_x = -F\cos\theta$

$F_y = -F\sin\theta$

Force Equilibrium

$\Sigma F_x = -F_x = ma$

$a = \frac{-F_x}{m}$

no acceleration in y direction

$\Sigma F_y = N - mg - F_y = ma_y^{\,0}$

$N = mg + F_y$