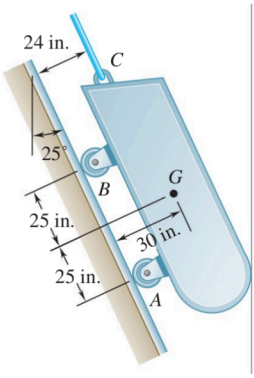
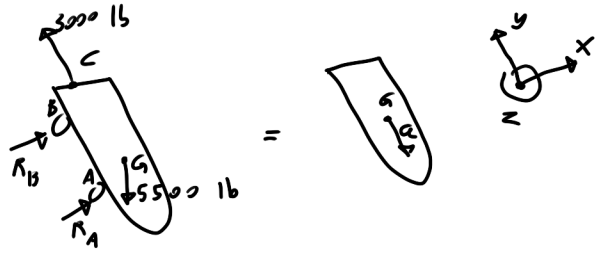
A loading car is at rest on a track forming an angle of 25° with the vertical. The gross weight of the car and its load is 5500 lb, and it acts at point G. Knowing the tension in the cable connected at C is 3000 lb, determine (a) the acceleration of the car, (b) the reaction at each pair of wheels.





$$\Sigma F_y = ma_y$$

$$3000\,\text{lb} - 5500\,\text{lb}\cos 25 = \frac{5500\,\text{lb}}{32.2\,\text{ft/s}^2}\,a$$

$$\frac{(3000\,\text{lb} - 5500\,\text{lb}\cos 25)\,32.2\,\text{ft/s}^2}{5500\,\text{lb}} = a$$

$$\boxed{-11.6\,\text{ft/s}^2 = a}$$

$$\Sigma F_x = ma_{G_0}$$

$$R_A + R_B - 5500\,\text{lb}\sin 25 = 0$$

$$R_A + R_B = 2324\,\text{lb} \qquad R_A = 2324\,\text{lb} - R_B$$

$$\Sigma M_G = I\alpha_0 = 0$$

$$25\sin R_A - 25\sin R_B - 6\sin 3000\,\text{lb} = 0$$

$$25\sin(2324\,\text{lb} - R_B) - 25\sin R_B - 6\sin 3000\,\text{lb} = 0$$

$$25\sin 2324\,\text{lb} - 25\sin R_B - 25\sin R_B - 6\sin 3000\,\text{lb} = 0$$

$$-50\sin R_B = 6\sin 3000\,\text{lb} - 25\sin 2324\,\text{lb}$$

$$-50\sin R_B = -4\times10^4\,\text{lb in}$$

$$R_B = \frac{-4\times10^4\,\text{lb in}}{-50\,\text{in}} = \boxed{802\,\text{lb} = R_B}$$

$$R_A = 2324\,\text{lb} - R_B = 2324\,\text{lb} - 802\,\text{lb}$$

$$\boxed{R_A = 1522\,\text{lb}}$$