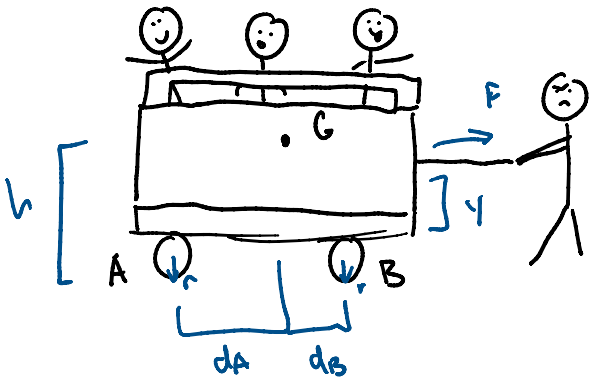
20-R-KIN-DK-16

July 22, 2020 9:47 AM

20-R-KIN-DK-16 Beginner Translation (RBK)

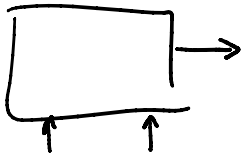
Inspiration: 17-34 Hibbeler



You are forced to pull a group of kindergarteners in a cart. If you apply a horizontal force of ***F = 600 N***, determine the normal force on its wheels. The cart has a total mass of ***m = 160 kg*** and has a center of mass at G. Assume the wheels have negligible mass.
Wheel A is located ***0.25 m*** from one end of the cart and is a horizontal distance of ***d_A = 0.89 m*** from G.
Wheel B is located ***0.25 m*** from one end of the cart is a horizontal distance of ***d_B = 0.39 m***.
You apply the horizontal force at a height ***y = 0.5 m*** from the bottom of the cart.
The center of gravity G is located at a height ***h = 1.1 m*** from the ground.

$\Sigma F_x = 160\, a_{Gx} = 600 \qquad a_{Gx} = 3.75$

$\Sigma F_y = N_A + N_B - (160)(9.81) = 0$



$\Sigma M_A = -160(9.81)(0.89) + N_B(1.2) - 600(0.9) = -(160)(3.75)(1.1)$

$N_B = 1064.12$

$N_A = 505.44$