**Answer on Question #61857-Physics-Mechanics**

Two people sit in a car that weighs 8000 N as shown in the figure. The person at the front weighs 700 N while the one in the back weighs 900 N. The distance between the front and back wheels is L units. The person on the front is sitting L/3 back from the front wheels. The person on the back is sitting L/2 back from the person on the front. The center of gravity of the car is 0.4L units behind the front wheel. How much force does each front wheel and each back wheel of the car support if the people in the car sit along the centerline of the car?
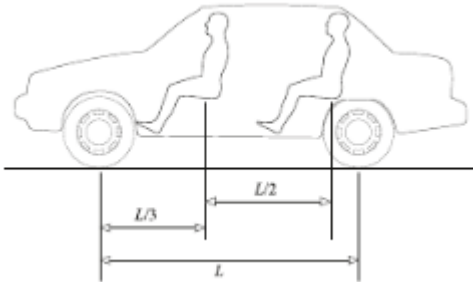


**a. 2.09 kN, 2.71 kN**

b. 4.11 kN, 5.22 kN

c. 5.021 kN, 4.31 kN

d. 1.42 kN, 3.72 kN

**Solution**

Let's apply the torque requirement for equilibrium:

$$900 \cdot \frac{5}{6}L + 700 \cdot \frac{L}{3} + 8000 \cdot 0.4L = 2FL$$

$$F = \frac{900 \cdot \frac{5}{6} + 700 \cdot \frac{1}{3} + 8000 \cdot 0.4}{2} = 2.09 \ kN$$

Let's apply the Force requirement for equilibrium:

Total force up by 4 wheels is equal to the total weight down.

$$2F + 2P = 8000 + 700 + 900 = 9600$$

$$2(2090) + 2P = 9600$$

$$2P = 5420$$

$$P = 2710 \ N = 2.71 \ kN.$$