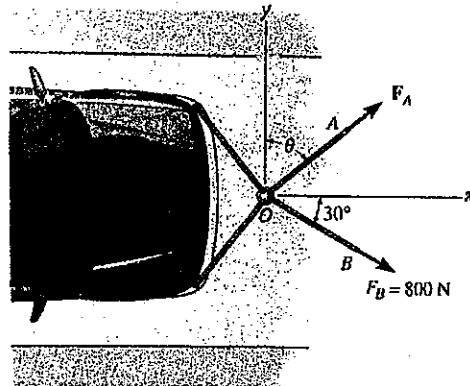
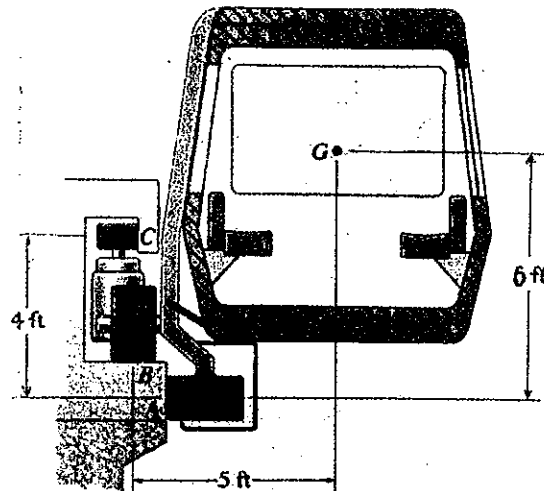


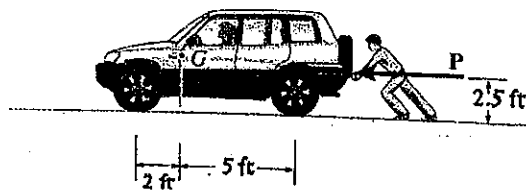
1. Determine the magnitude and direction, measured counterclockwise from the positive x axis, of the resultant force acting on the ring at pint O , if $F_A = 750$ N and $\theta = 45^\circ$. [20]



2. The train car has a weight of 24000 lb and a center of gravity at G . It is suspended from its front and rear on the track by 6 tires located at A , B , and C both in front and rear of the car, equal loaded. The track is assumed to be a smooth surface. Determine the normal reactions on these tires. [20]

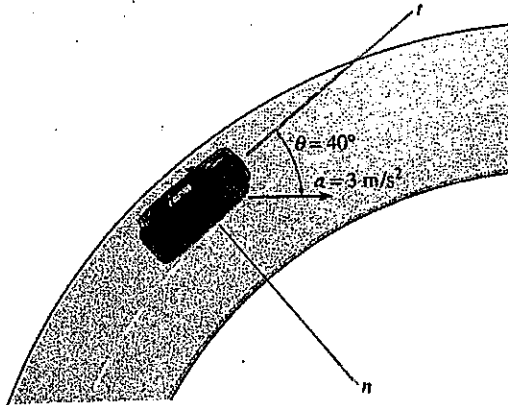


3. The vehicle has a weight of 2600 lb and the center of gravity at G . Determine the horizontal force P that must be applied to overcome the rolling resistance of the wheels. The coefficient of rolling resistance is 0.5 in. The tires have a diameter of 2.75 ft. [20]



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4. Determine the speed of the car if it has the acceleration shown and is traveling on a road which has a radius of 50 m. Also, what is the car's rate of increase in speed? [20]



5. Determine the banking angle θ for the race track so that the wheels of the racing cars when it will not have to depend upon friction to prevent ant car from sliding up or down the track. Assume the cars have negligible size, a mass m , and travel around the curve of radius ρ with a speed v . [20]



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