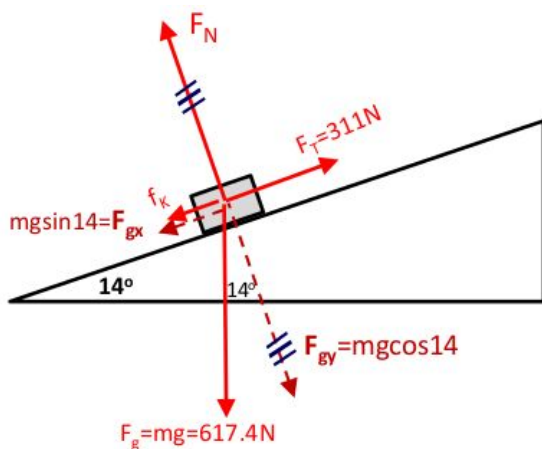


Ramp Review

1. Suppose Joe, who weighs 625N, stands on a bathroom scale.
 - a. Draw a free body diagram.
 - b. What force would the scale exert on Joe? In what direction? What is another name for this force? (624N [up])
2. If Joe now holds a 50N cat in his arms, what force would the scale exert on him? (675N [up])
3. After Joe puts down the cat, his father comes up behind him and lifts upward on his elbows with a 72N force. What force does the scale now exert on Joe? (553N [up])
4. The coefficient of kinetic (sliding) friction between rubber tires and wet pavement is 0.50. The brakes are applied to a 750kg car travelling 30m/s and the car skids to a stop.
 - a. What is the size and direction of the force of friction that the road exerts on the car? (-3.7×10^3 N)
5. What would be the size and direction of the acceleration of the car? Why would it be constant? (-4.9 m/s²)
4. How far would the car travel before stopping? (92m)
5. If the tires of the car did not skid, the coefficient of friction would have been 0.70. Would the force of friction have been larger, smaller or the same? Would the car have come to a stop in a shorter, the same, or a longer distance? Explain.
6. A certain sports car accelerates from 0 to 100km/h in 9.0s (average acceleration = 3.0m/s²). The mass of the car is 1354 kg. The average backward force due to air drag

during acceleration is 280N. Find the forward force required to give the car this acceleration. (4400 N forward)

7. A heavy box is pulled across a wooden floor with a rope. The rope makes an angle of 60° with the floor. A force of 75N is exerted on the rope. What is the component of the force parallel to the floor? (37.5N)
8. A 466N object is on a 33.3° incline that is 8.45m long and frictionless. How long will it take the object, starting from rest, to get to the bottom of the incline? ($t=1.77s$)
9. A 63-kg water skier is pulled at a constant speed up a 14.0° incline by a rope parallel to the incline with
 - a. tension of 311 N.
 - b. What is the coefficient of kinetic friction between the skis and the incline? ($\mu_k=.27$)



- c. If the tension in the rope were increased to 511 N, determine the acceleration of the skier. (hint: it was constant speed in part A. What is different now?) ($a=3.17\text{m/s}^2$)