

Dynamics Worksheet #2

(adapted)

1. A 1.2×10^3 kg car is accelerating at 1.6 m/s^2 . If the coefficient of friction is 0.15, what is the force supplied by the engine?
2. You are pushing a 55 kg refrigerator along at a speed of 1.5 m/s using an applied force of 2.5×10^2 N when you hit a carpet. The carpet has a coefficient of friction of 0.62. How far will the fridge travel before it stops on the carpet?
3. A car is travelling at 120 km/hr when it slams on the brakes. How long is the skid mark if the coefficient of friction is 0.62 ? (hint: convert km/hr to m/s)
4. A skidder is dragging a 5.2×10^2 kg log through the forest at a constant speed of 3.5 m/s. If the skidder is applying a force of 1.8×10^3 N to the log to keep it moving, what is the coefficient of friction between the log and the ground? (Hint: what does constant speed say about the forces?)

5. A curler gives a rock an initial velocity of 4.2 m/s. After travelling down the 32m ice sheet (coefficient of kinetic friction = 0.0035) the rock runs onto the carpet (coefficient of kinetic friction = 0.41). How far does the rock slide on the carpet? (Hint: find the acceleration on the ice, then find the final velocity as it leaves the ice, then find the distance on the carpet)
6. A tow-truck is trying to pull a 1.4×10^3 kg car out of some mud. The coefficient of static friction is 0.76. What force will the tow truck have to apply to the car before it will start to move?
7. A 3.2×10^3 kg sailboat is sailing at 6.2 knots (1 knot = 1.852 km/h) when the wind dies. The boat drifts for 65 m before coming to a stop.
- (a) What is the coefficient of friction between the hull and the water?
- (b) How long does it take to stop?