

Use $g = 9.80 \text{ m/s}^2$ Do work on your paper; put answers here.

1. What is the weight of a 90.0 kg man? _____
2. Since the weight of 1.0 kg on the earth is about 2.2 pounds, 1.0 pound = _____ N.
3. A wheel falls off an airplane and falls for 10.0 sec.
 - a. How far down does it fall? _____
 - b. How fast is it going in the downward direction at the end of 10.0 sec? _____
 - c. How long does it take for the wheel to fall the first 100. m vertically? _____
4. A good baseball pitcher can throw a ball at about 90.0 mi/hr (40.0 m/s). Calculate how high in the air a pitcher could throw a baseball if he projected it straight up at 90.0 mi/hr. _____
How long would it take the ball to get to the top of its path? _____
How long would it take to fall back to earth from the top? (Prove it.) _____
5. How much force is required to swing a 1.00 kg mass in a 2.00 m (radius) circle with a period of 1.00 sec? _____ How fast is the mass going? _____ What is its acceleration? _____
6. A car (1.00×10^3 kg) goes around an unbanked circular corner ($r = 100. \text{ m}$) at 30.0 m/s (about 65 mph).
 - a. Find the centripetal acceleration. _____
 - b. What force must the road exert on the tires? _____
 - c. What kind of force is it? (Name it.) _____
7. A certain thread will stand 100. N of force without breaking. (And no more!)
 - a. How fast can a 1.00 kg mass be whirled in a 1.00 m radius circular orbit without breaking the thread? _____
 - b. What is the smallest orbit allowing a speed of 100. m/s? _____
8. A ball is thrown vertically upward with a velocity of 24.0 m/s from a railroad flatcar moving horizontally with a velocity of 4.00 m/s. Quantitatively describe the path of the ball as seen by an observer: (i.e. give some numbers describing the path dimensions - height and horizontal distance.)
 - a. on the flatcar _____
 - b. on the ground nearby _____
9. A 50.0 kg mass is hung by two ropes of unequal length as shown. Calculate the tension in each rope.

$T_1 =$ _____
 $T_2 =$ _____

