Homework 4

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1) Yes, since an object’s acceleration is directly proportional to the net force acting on it.

15) Since mass and force have an inverse relationship, the object with less mass will accelerate faster than the object with more mass.

18) If the acceleration of a sliding block is quadrupled, you can infer that the net force has also quadrupled.

19) The acceleration will decrease by a factor of 3.

21) The object’s speed will decrease.

30) The object with the greater speed will encounter greater air resistance.

51) a = Fnet/m = 30,000 N \* 2 / 30,000 kg = 2 m/s^2

52) (a) a = vf-vi/t = 0 m/s – 9 m/s /.2s = -45 m/s^2

(b) a = Fnet / m -> Fnet = a\*m = -45 m/s^2 \* 100 kg = -4500 N

58) When exerting a force on a ball tossing it upward, that force lasts as long as your hand is contacting the ball. Once the ball leaves your hand, you are no longer exerting force upon it.

61) An object on Earth and an object on the moon have the same inertia because the inertia of an object is directly proportional to an object’s mass, not its weight.

Additional questions

1. a = 40 N / 5 kg = 8 m/s^2
2. Fnet = a \* m = 8 m/s^2 \* 2.5 kg = 20 N
3. m = Fnet / a = 20 N / 5 m/s^2 = 4 kg
4. a = vf-vi/t = 7 m/s – 0 m/s / 2 s = 3.5 m/s^2
5. vf = t \* a + vi = 5 s \* 4.2 m/s^2 + 0 = 21 m/s
6. a = vf-vi/t = 18 m/s – 30 m/s / 4 s = -12 m/s / 4 s = -3 m/s^2
7. (a) a = Fnet / m = 2250 N / 750 kg = 3 m/s^2

(b) vf = t \* a + vi = 10 s \* 3 m/s^2 + 0 m/s = 30 m/s

(c) d = (vf + vi / 2) \* = (30 m/s + 0 m/s / 2) \* 10 s = 150 m