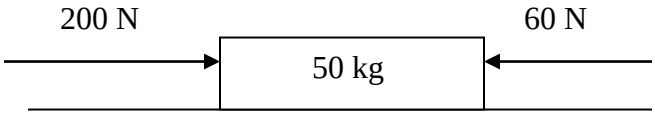
Dynamics Review 1

1.



If the mass starts at rest, how long does it take to travel 75 m?

2. A child pushes a 10 kg wagon along with a downward force of 50 N at an angle of 40^o below the horizontal.
    a. Draw a free body diagram
    b. What is the acceleration of the wagon? (Ignore friction)
    c. What is the normal force on the wagon?

3. Mike pushes a 900 kg car with a force of 300N West, and Sally pushes the car with a force of 500N South.
    a. What is the resultant force?
    b. What is the force of friction if they are able to accelerate the car from rest to a velocity of 5m/s in 20m?

4. A 75kg cyclists needs to accelerate at a rate of $5.0 m/s^2$. What net force must be provided? (Ignore friction)

5. What is the acceleration in m/s^2 of a 500 gram object undergoing a force of 6N ?

6. What force is required to stop an 8000kg fighter jet in 2.0s if it has a velocity of 100km/h? (Like on a aircraft carrier)

7. A 50g mass on a string hangs over a pulley. The other end of the string is attached to a toy car.
    a. If the acceleration of the toy car is $3.0 m/s^2$, what is the mass of the car?
    b. Using the mass from part a, what is the acceleration if there is now 0.25N of friction?

8. If a cable has a safety rating of 20,000N and has a load of 1000kg, find the minimum safest distance the object can fall if it reaches a falling speed of 10m/s.

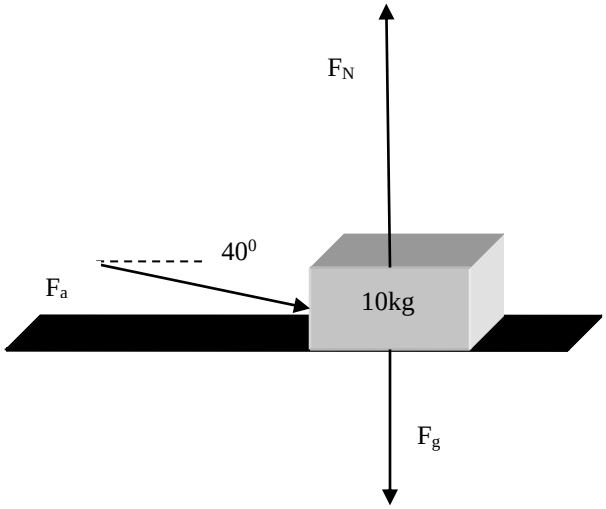
9. What force must I apply in order to keep a puck sliding at a constant velocity if there is 5N of friction?

10. The gravity of the moon is $1/6^{th}$ that on earth. Find the weight (force) of an 80kg person on the moon.

Dynamics Review 1 - Answers

1. t = 7.32s

2. a)



b) $a = 3.83 m/s^2$ c) $F_N = 130N$

3. a) Fnet = 583N [59.0^0 SofW] b) $F_f = 20.5N$ [59.0^0 NofE]

4. F = 375N

5. $a = 12 m/s^2$

6. F = -111,000N

7. a) m = 0.113kg b) $a = 1.47 m/s^2$

8. d = 4.90m

9. F = 5N in the opposite direction of friction

10. $F_g = 131N$