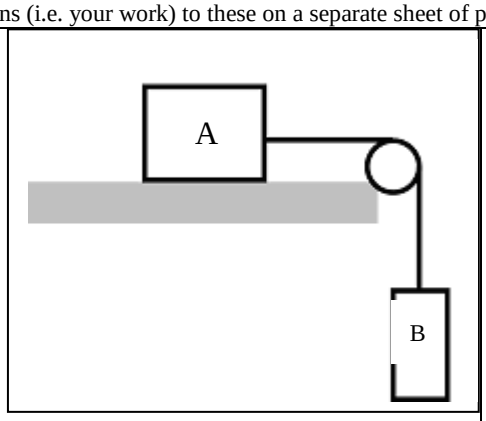
Pulleys

Directions: Show the solutions (i.e. your work) to these on a separate sheet of paper.

a) 44.4 N, 1.92 m/s/s
b) 9.81 N, 0.00382 m/s^2
c) 9.79 N, 9.79 m/s/s
d) 16.6 kg
e) 47.8 N, 1.32 m/s/s



5. The plane and pulley are frictionless for a) – d). e) has a bit o' friction

a) If A has a mass of 23.1 kg, and B has a mass of 5.63 kg, what is the tension in the string, and the acceleration of the system?

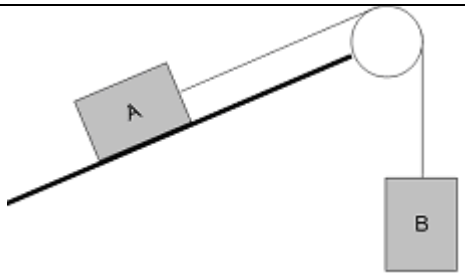
b) If A has a mass of 2567 kg, and B has a mass of 1.00 kg, what is the tension in the string, and the acceleration of the system?

c) If A has a mass of 1.00 kg, and B has a mass of 500. kg, what is the tension in the string, and the acceleration of the system?

d) If A has a mass of 35.0 kg, What does B need to be so that the system has an acceleration of 3.15 m/s/s?

e) Answer part a) with a coefficient of friction of 0.0759 between block A and the plane.

a) 2.8 m/s/s, 35 N
b) -0.48 m/s/s, 18 N
c) 3.55 kg
d) 7.5 kg



6. The plane and pulley are frictionless.

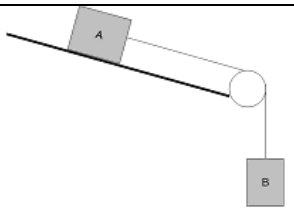
a) If A and B both have a mass of 5.0 kg, and the plane makes an angle of 25^o with the horizontal, what is the acceleration and the tension in the cable?

b) Solve as in problem a), but give A a mass of 5.0 kg, and B a mass of 1.78 kg.

c) Suppose A has a mass of 4.51 kg, and accelerates from rest 3.27 m up the ramp in 1.81 seconds. What must the mass of B be? (use 25.0^o)

d) If the plane angle is 30^o and A is 15 kg, what should the mass of B be to prevent acceleration?

a) 6.43 m/s/s 14.6 N
b) .468 kg
c) 27.2 N



7. The plane and pulley are frictionless, and the plane makes an angle of 21.0^o with horizontal.

a) If A has a mass of 5.00 kg, and B 4.30 kg, what are the acceleration and the tension in the cable?

b) If A has a mass of 3.12 kg, and the tension in the cable is 2.56 N, what must the mass of B be?

c) Using the masses from part a), suppose you observed an acceleration of only 3.50 m/s/s. What frictional force must exist between A and the plane? (assume the plane is not frictionless)