Pulleys and Equilibrants

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

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| a) 44.4 N, 1.92 m/s/s  b) 9.81 N, 0.00382 m/s2  c) 9.79 N, 9.79 m/s/s  d) 16.6 kg  e) 47.8 N, 1.32 m/s/s | B    A | **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 Bneed 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 25o 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 25.0o)  d) If the plane angle is 30o and A is 15 kg, what should the mass of B be to prevent acceleration? |

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| 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 21.0o 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) |
| A = 606 N  B = 299 N |  | 8. Cable A makes an angle of 63.0o with the horizontal, and B makes an angle of 23.0o with the horizontal. What is the tension in each cable for there to be no acceleration of the system? |
| 23.16 N At 292.8o (Trig) (23 and 290 with SF) |  | 10. Find the third force (the equilibrant) that would prevent the system from accelerating. |
| 6.000 N At 348.9o (Trig) (6.0 and 350 with SF) |  | 11. Find the third force (the equilibrant) that would prevent the system from accelerating. |