**Net Force**

Directions: Show the solutions (i.e. your work) to these on a separate sheet of paper. Use g = 9.81 m/s/s

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| 33.4 N | 1. What is the weight of a 3.40 kg mass? |
| 73.4 kg | 2. What mass has a weight of 720. N? |
| .112 m/s/s | 3. Bob must exert 240. N of force on a 980. Kg car to move it at a constant speed up an incline. (The frictional and gravity force is 240. N) What is the acceleration of the car if he exerts a force of 350. N? |
| +3.5 m/s/s  -4.8 m/s/s | 4. What is the acceleration of a 6.0 Kg object hanging on a string that is under a tension of 80. N? 30. N? (Make up positive) |
| 125 N | 5. What force is needed to accelerate a 60.0 Kg cart and rider from rest to 4.20 m/s in 2.50 seconds when the friction force is 24.0 N? |
| 2.6 kg | 6. What is the mass of a box that moves at a constant velocity along a surface with a force of 15 N, and accelerates at +4.2 m/s/s when you exert +26 N? (The box is moving in the same direction as the forces, there is a frictional force of 15 N) |
| 1000 kg | 7. If you exert a force of 60. N on a car, it moves at a constant velocity. (i.e. there is a frictional force of 60. N) What is its mass if when you exert 80. N on it, it accelerates from rest to 2.0 m/s in 100. seconds? |
| 901 N | 8. A 60.0 Kg rocket accelerates upward from rest reaching a height of 23.4 m in 3.00 seconds. What must be the thrust of the engine? |
| 77 N | 9. It takes 45 N to make a 10. kg cart move at a constant speed. What force does it take to make the cart accelerate at 3.2 m/s/s in the direction it is moving? |
| 80. N  18 N | 10. What tension would accelerate a 5.0 Kg object suspended on a string upwards at 6.2 m/s/s? Downwards? |
| 11.24 N | 11. A 45.00 gram rocket accelerates upward from 0 to 12.00 m/s in .05000 seconds. What must be the thrust of the engines? |
| 1.2 kg | 12. A rocket has engines that produce 60. N of thrust. What is its mass if it accelerates upward at 40. m/s/s? |
| -2.33 m/s/s  +281 N | 13. A dog is pulling forward on a 215 kg sled that slows from +6.20 m/s to rest in a distance of 8.25 m. What is the deceleration of the sled? If the force of friction slowing the sled is 782 N, what force is the dog exerting in the direction the sled moves? |
| -7.83 m/s/s  -32.0 kN | 14. An 18,380 kg airplane slows from 48.1 m/s to rest in 6.14 seconds. What was its acceleration? If the engines generated 112 kN (112,000 N) of reverse thrust, how much air friction was acting against the plane as it slowed down? (this would be average) |
| -21.6 m/s  +72.6 m/s/s  +9750 N | 15. A drop tower has a 118 kg experiment that free falls from rest for 2.20 seconds, and strikes an airbag that slows it to rest in a distance of 3.20 m. With what velocity does the experiment strike the airbag? What is the upward acceleration as the experiment stops? What is the upward force acting on the experiment to stop it? |
|  | Problems 16-20 are questions like the skill set and the test |
| 1.52 s | 16. A 9.0 kg object hangs on a string that can have a maximum tension of 275 N. What is the shortest time you could raise the object from rest a distance of 24.0 m? |
| 2190 N | 17. A 58.0 kg person is rock climbing when he loses his grip and falls. He hits the end of the rope going 15.3 m/s straight down, and is stopped by the rope in a vertical distance of 4.20 m. What is the average tension in the rope as it stops him? |
| 3280 N | 18. A 478 kg elevator accelerates downward reaching its top speed of 4.12 m/s in a time of 1.40 s. What is the tension in the supporting cable if it accelerates uniformly? |
| 2010 N | 19. A 528 kg elevator accelerates downward from rest reaching its top speed of 6.12 m/s in a distance of 3.12 m. What is the tension in the supporting cable if it accelerates uniformly? |
| 10,600 N | 20. A 984 kg elevator reaches a height from rest of 3.68 m in 2.70 s. What is the tension in the supporting cable if it accelerates uniformly? |