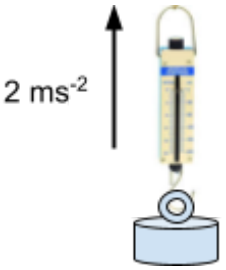
Our Dynamic Universe

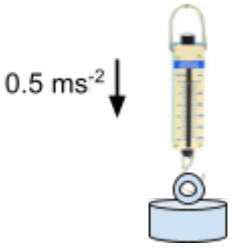
Tows and springs

1) A 5 kg mass is attached to a newton balance. The newton balance is accelerated upwards at 2 ms^{-2}



   a) Determine the reading on the scale. [59 N]
   b) Find the reading on the scale when the newton balance is stationary. [49 N]

2) A 6 kg mass attached to a newton balance is accelerated downwards with an acceleration of 0.5 ms^{-2}.



   a) Determine the reading on the scales. [55.8 N]
   b) Find the reading on the scale when the newton balance is moving downwards with a constant speed of 1.0 ms^{-1} [58.8 N]

3) An engineer holds a 1 kg mass on a newton balance to determine the vertical acceleration of an elevator. The table below is a summary of his readings. Complete the table.

Newton balance reading.	acceleration up/down
10.2 N	
9 N	
9.8 N	

4) A man of mass 70 kg stands on weighing scales inside a lift.

a) Determine the weight of the man when the lift is stationary. [686 N]

b) Determine the weight of the man if the lift accelerates downwards with an acceleration of 0.5 ms^{-2} [651 N]

c) Determine the weight of the man if the lift accelerates upwards with an acceleration of 0.5 ms^{-2} [721 N]

5) Find the size and direction of the acceleration that would be needed to give the reading on newton scales of a person of 60 kg person an apparent weight of 582 N

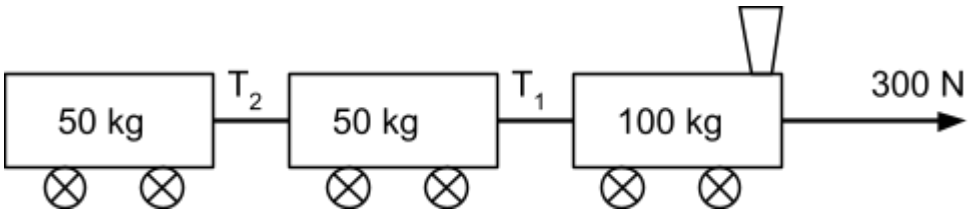
[0.1 ms^{-1} downwards]

6) A 2,000 kg car tows a 1,500 kg caravan.

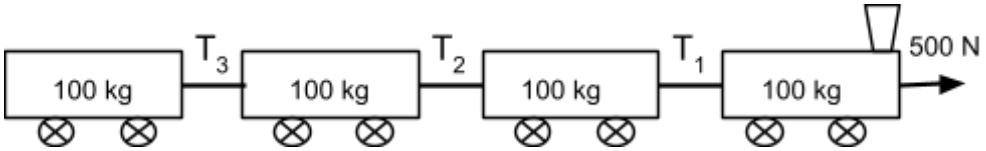
a) Calculate the tension in the towing bar when the car accelerates away from traffic lights at 2 ms^{-2} [3000 N]

b) When the car is moving with a constant speed of 12 ms^{-1} determine the tension in the tow bar.

7) Find the tension force T_1 and T_2 in the following tourist train which has an unbalanced force of 300 N



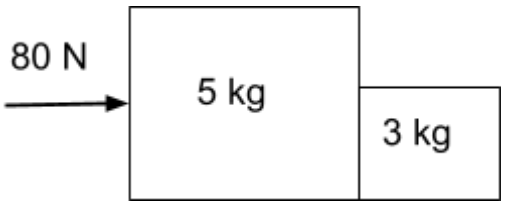
8) Find the tension force T_3 in the following tourist train which has an unbalanced force of 500 N accelerating it along the track.



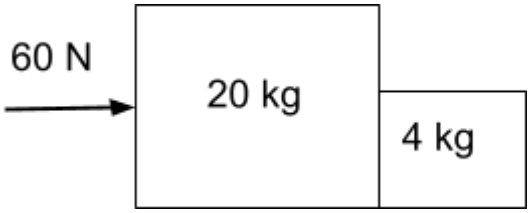
[125 N]

9) Calculate the force on the smaller box in each of these situations below:

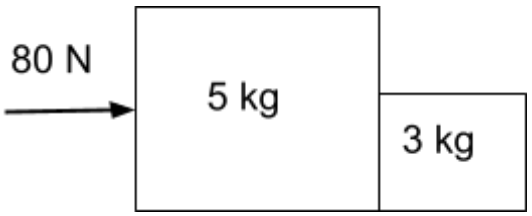
a)



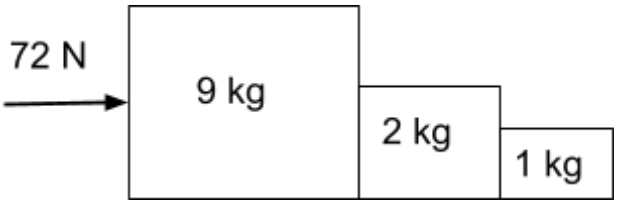
b)



c)



d)



[a) 30 N, b) 10 N, c) 30 N, d) 6 N]