Date:\_\_

Chapter 4: Force and the Law of Motion

## **<u>1D Force Problems (Multiple Forces)</u>**

## Solve the following problems

1. What is the acceleration of a 15 kg box when 1 person pushes on it with a force of 60N east and the other person pushes with a force of 40N west?

2. What is the acceleration of a 15 kg box when 1 person pushes on it with a force of 60N east and the other person pushes with a force of 40N east?

3. If a box weighing 300 N sits on a table and if 3 people push on the box with equal forces in the same direction, what force must each person push with to give the box an acceleration of  $15 \text{ m/s}^2$ .

4. If a car engine can produce a force of 6000N and the car itself has a mass of 1500kg. What would the maximum acceleration of the car be? Now if an 80kg and a 50 kg person are in the car, what is the acceleration? Finally if the car has the people listed above in it and it is towing a 400kg trailer, what is the acceleration of the car?

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5. When an elevator is stopped on the 5<sup>th</sup> floor of a building a person standing in the elevator weights 750N. The elevator then begins to descend accelerating downward at  $2m/s^2$ . What is the persons weigh during this period?

b. The elevator then stops accelerating and begins to move down at a constant rate. What is the person weight at this time?

c. Just before the ground floor the elevator begins to slow down by accelerating up at  $2m/s^2$ . What is the persons weight at this time?

d. Finally the elevator comes to rest at the ground floor. What is the person weight now?

6. If the same person in problem 5 rides the elevator back up to the  $5^{th}$  floor, accelerating up at  $2m/s^2$ , then moving at a constant rate, then slowing down at the top at a rate  $2m/s^2$ , finally reaching the  $5^{th}$  floor, what does the person weigh during each interval going back up?