Name: _____ Date: _____

Force = ma Word Problems

Instructions: Complete each word problem by 1) using the BUC technique, 2) writing out the equation, 3) plugging in the correct numbers and 4) putting a box around the your answer. Remember NO NAKED #s. You may use a calculator only after you have completed steps 1-3 above. You may use additional paper for your calculations.

1. How much force is required to accelerate a 50kg mass at 4 m/s^2?

2. Given a force of 75N and an acceleration of 3 m/s^2 what is the mass?

3. What is the acceleration of a 24 kg mass pushed by an 8N force?

4. On the surface of the earth, how much does a 10kg mass weigh? Remember that the acceleration due only to gravity on Earth is $9.8m/s^2$

5. On the surface of the moon, how much does a 10kg mass weigh? Remember that the acceleration due to the Moon's gravitational pull is 1.6 m/s^2.

6. What is the net force applied to a ball when 5N force from the left and a 25N force from the right are applied?
   a. Are the forces balanced? _____
   b. If not, which direction is the ball moving? _____
   c. What would the net force be if the 5N and 25N forces were applied both from the left? _____
   d. Which direction would the ball be moving then? _____

7. Your bicycle has a mass of 9.1 kilograms. You accelerate at a rate of 1.79 m/s^2. Calculate the net force that is accelerating the bicycle.

8. The Space Shuttle has a liftoff mass of 2,041,000 kg and accelerates at a rate of 16 m/s^2. Calculate the force (thrust) that is accelerating the Space Shuttle.

9. A rocket accelerates at 56 m/s^2. It has a mass of 800,000 kg. Calculate the force (thrust) that the rocket engines must supply.

10. A runner has a mass of 89 kilograms. He produces a force of 84 Newtons between the ground and his running shoes. How fast does he accelerate?

11. Calculate the acceleration of a car if the force on the car is 450 Newtons and the mass is 1300 kilograms.

12. Calculate the acceleration of a jet car racing on the Bonneville Salt Flats if the force on it (the "Thrust") is 500,000 Newtons and the mass is 2,100 kilograms.

13. What is the force of an object that has a mass of 15g and is dropped from a height of 3meters from within a vacuum (meaning has no air resistance)?

14. What is the net force on an object when an 8N force is applied from the left and a 3N force is applied from the right? If the object is moving, in which direction will it travel? Include a diagram in to explain your response.

15. If a car is pushed with a Force of 150N and has a mass of 107 grams, what is its acceleration after 3 seconds? _____ And how far (meters) did it travel in that time?

16. How much force is required to accelerate a 2kg mass at 3 m/s^2?

17. Given a force of 100N and an acceleration of 10 m/s^2, what is the mass of the object?

18. Find the acceleration and direction of motion for a 2kg block that that has a force of 4N applied from the left and a force of 8N applied from the right.

19. Jose has a mass of 70kg. What is his weight on Earth? Weight is a force.

20. What does a 10kg mass weigh on the moon?

21. On the moon, Bob weights 160N while on Earth Fred weighs 882N. Who has the greater mass?

22. How much force is required to accelerate an 8kg mass to $5m/s^2$ if there is a 14N force of friction? Solve the problem and include a drawing of the forces exerted on the object.