

Newton's 2nd Law

Name _____

Show all work including equations and substitution.

Simple Force Problems

- 1.) If $m = 5 \text{ kg}$ and $a = 3 \text{ m/s}^2$, find the force.

- 2.) If $m = 10 \text{ kg}$ and the $F = 50 \text{ Newtons}$, find the acceleration.

- 3.) If $F = 125 \text{ N}$ and the acceleration is 3 m/s^2 , find the mass.

- 4.) What is your weight in Newtons on earth? What is it on the moon ($g \approx 2.3 \text{ m/s}^2$)? On Jupiter ($g \approx 23 \text{ m/s}^2$)?

Sum of Force Problems in one dimension

- 5.) If two forces are acting on an object in the positive x direction and one is 5 N and the other is 23 N , what is the acceleration if the mass is 10 kg ?

- 6.) If there are three forces on an object all in the x direction and they are 8 N , -2 N and 16 N and the object accelerates at 2 m/s^2 , what is the mass of the object?

- 7.) If you pull up an object at 12 N and gravity is acting on the object with a force of 9.8 N down what is the acceleration of the object and which direction?

Sum of the masses problems

- 8.) If two objects (mass of object A = 2 kg and mass of object B = 7 kg) are pulled together with a force of 55 N what is the acceleration of Object A? Object B? of the combined objects?

- 9.) If two objects are connected by a strong steel cable and are being pulled by a force of 200 N , what is the acceleration on object A? On Object B? On the entire system? (Mass of object A = 12 Kg , Mass of Object B = 8 Kg)

Sum of Force problems in more than one dimension

- 10.) If two students are pulling on a third student (mass = 60 kg), what is the acceleration of the third student if the first student pulls with a force of 120 N at 30° and the second student pulls with a force of 95 N at 110° ? (assume the floor is smooth, i.e. no friction) What would happen to the student's acceleration if friction were included?
- 11.) A student who weighs 700 N is hanging from a bar with two arms and doing chin-ups. If he pulls up with 370 N on each arm at an angle of 10° from straight up what is his acceleration?
(hint: try drawing a picture first)