Name _____ Period _____ Date _____

Example Problems

5.1 Force and Acceleration

E1. A monkey is pulling a wagon with a constant net force of 38 N. If the mass of the wagon is 57 kg, calculate the acceleration of the wagon.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =

a) _____ ← units

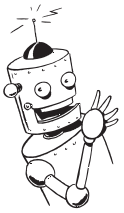
E2. A monkey catches a 0.5 kg softball in his glove applying a constant net force of -25 N. Calculate the magnitude of the softball's acceleration by the monkey.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =



a) _____ ← units

Name _____ Period _____ Date _____

Chapter 5 Newton's Second Law

E3. When hit by a professional tennis player, a 0.314 kg tennis ball can accelerate off the racket at a rate of 164 m/s². Calculate the force the player's racket exerts on the ball.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =

a) _____ ⟵ units

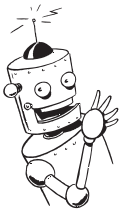
E4. A 2,300 kg monkey-mobile slows at a rate of -3.0 m/s² when approaching a stop sign, calculate the magnitude of the net force acting on the car as it slows down.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =



a) _____ ⟵ units

Chapter 5 Newton's Second Law

E5. A crate is filled with cocoanuts and is pushed across an ice-covered lake by a monkey. The monkey pushes on the crate with a horizontal force of 47 N causing the crate to accelerate at a rate of 0.08 m/s², calculate the mass of the crate.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =

a) _____ ← units b) _____ ← units

E6. Starting from rest a dragster attains a speed of 58.9 mph (26.3 m/s) in 0.59 seconds. If the dragster has a mass of 873 kg, calculate the average acceleration and the magnitude of the net force acting on the dragster.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

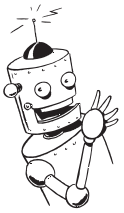
F =

m =

v_o =

v_f =

t =



a) _____ ← units b) _____ ← units

Name _____ Period _____ Date _____

Chapter 5 Newton's Second Law

E7. A monkey pushes a loaded sled of mass 240 kg over a frictionless surface on a frozen lake. Starting fro rest the monkey pushes the sled 2.3 meters and exerts a constant horizontal force of 130 N, calculate the sled's final velocity.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

v_o =

v_f =

d =

t =

a) _____ ◄—— units

E8. The monkey in previous problem wants to reverse the direction of the sled's velocity in 4.5 seconds, calculate the size of the force the monkey must apply to the sled.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

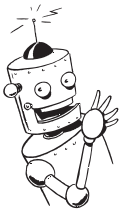
F =

m =

v_o =

v_f =

t =



a) _____ ◄—— units

Name _____ Period _____ Date _____

Student Problems

5.1 Force and Acceleration

1. With each step a monkey takes he exert a net force of 59 N on the ground. If the monkey has a mass of 58 kg, calculate the monkey's acceleration.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =

a) _____ ⟵ units

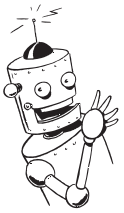
2. A monkey pushes a wagon filled with coconuts. The total mass of the wagon is 24.3 kg and the monkey applies a constant net force of 85.5 N, calculate the acceleration of the wagon.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =



a) _____ ⟵ units

3. A crazy monkey takes your suitcase and throws it across the room. The suitcase has a mass of 25 kg and slows at a rate of 2.2 m/s^2 as it slides across the floor. Calculate how much force the floor exerted on the suitcase as it slides to a stop.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =

a) _____ ← units b) _____ ← units

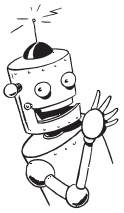
4. A tow-cable can withstand a maximum tension of 1,000 N before it breaks. A monkey offer to help a friend tow his broken down monkey-mobile to a repair shop. If the car has a mass of 2,100 kg, calculate the maximum acceleration that the car can be pulled with the tow-cable before the cable breaks.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =



a) _____ ← units b) _____ ← units

Name _____ Period _____ Date _____

Chapter 5 Newton's Second Law

5. A 4 kg block rests on a frictionless horizontal surface. Calculate the magnitude of the horizontal force that is required to give the block an acceleration of 3 m/s².

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =

a) _____ ← units

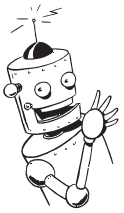
6. A monkey pulls his wagon with a net force of 110 N. The wagon accelerates at 2.5 m/s², calculate the total mass of the wagon.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =



a) _____ ← units

Name _____ Period _____ Date _____

Chapter 5 Newton's Second Law

7. A monkey-mobile accelerates from 0 to 60 mph, (0 m/s - 27 m/s), in 4.3 seconds. The car exerts a constant force of 4,106 N on the road, calculate the mass of the car.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =

v_o =

v_f =

t =

a) _____ ◄—— units b) _____ ◄—— units

8. A monkey-mobile, mass 1,430 Kg, is heading north at 26.82 m/s when the brakes are applied causing the vehicle to slow and come to rest in 2.32 seconds. If the average force acting on the vehicle is -16,530.8 N, calculate the acceleration of the monkey-mobile as it is brought to rest.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

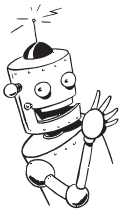
F =

m =

v_o =

v_f =

t =



a) _____ ◄—— units b) _____ ◄—— units

9. A 204.11 kg motorcycle accelerates from rest to a final velocity of 24.59 m/s in 6.0 seconds. Calculate the magnitude of the motorcycle's acceleration and the net force acting on the motorcycle.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =

v_o =

v_f =

t =

a) _____ ← units b) _____ ← units

10. A crazy monkey is driving his car at 10 m/s when he hits a tree causing the car to come to rest in 0.10 seconds. If the combined mass of the car and the monkey is 1,200 kg, calculate the acceleration of the car and net force that brings the car to rest.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

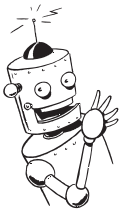
F =

m =

v_o =

v_f =

t =



a) _____ ← units b) _____ ← units

Chapter 5 Newton's Second Law

11. A 0.149 kilogram baseball initially moving at 100 mph (45 m/s) is brought to rest by the glove of a catcher in 0.040 second. Calculate the acceleration of the baseball and the net force exerted on the ball as it is brought to rest by the catchers glove.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

a =

F =

m =

v_o =

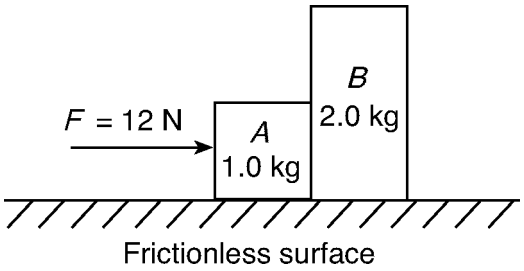
v_f =

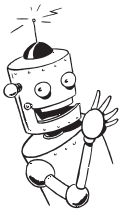
t =

a) _____ ⟵ units b) _____ ⟵ units

12. In the diagram, a 12 N force is being applied as pictured. ***A*** and ***B*** are initially at rest on a horizontal frictionless surface. Block ***A*** has a mass of 1.0 kilogram and block ***B*** has a mass of 2.0 kilograms. Find the magnitude of the acceleration of block ***B*** and the force acting on block ***B***.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve





a) _____ ⟵ units b) _____ ⟵ units