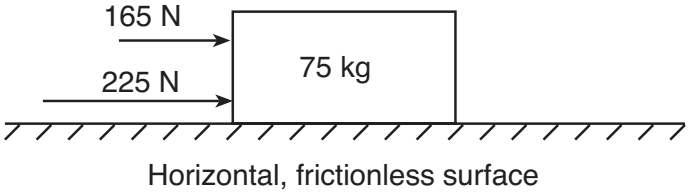
Name _____ Period _____ Date _____

Example Problems

5.3 Net Force

E1. Two horizontal forces, 225 N and 165 N, are exerted in the same direction on a 75 kg crate as shown below. Find the net force and the acceleration of the crate.



Label a coordinate system, write the formula, substitute and solve

$F_{net} =$

$F_1 =$

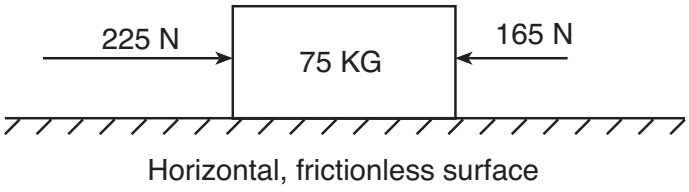
$F_2 =$

$a =$

$m =$

a) _____ ← units b) _____ ← units

E2. Two horizontal forces, 225 N and 165 N, are exerted in opposite directions on a 75 kg crate as shown below. Find the net force and the acceleration of the crate.



Label a coordinate system, write the formula, substitute and solve

$F_{net} =$

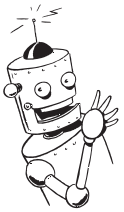
$F_1 =$

$F_2 =$

$a =$

$m =$

a) _____ ← units b) _____ ← units



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Chapter 5 Newton's Second Law

E3. A monkey and gorilla are playing tug-of-war with an old tire. The monkey pulls towards the left with a force of -400 N and the gorilla pulls towards the right with a force of 425 N. If the tire has a mass of 35 kg, calculate the net force and the acceleration of the tire.

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

$F_1 =$

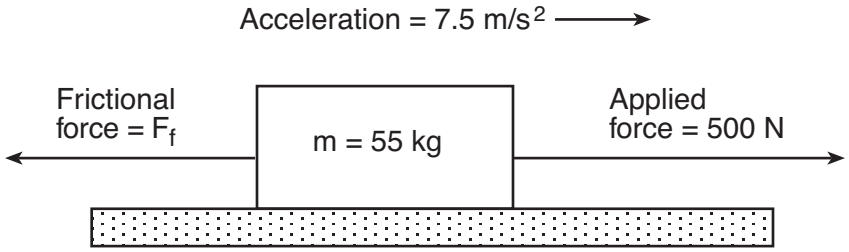
$F_2 =$

$a =$

$m =$

a) _____ ← units b) _____ ← units

E4. A 55 kg crate is pulled across the floor with a force of 500 N towards the right. If the acceleration of the crate is 7.5 m/s², calculate the magnitude of the frictional force.



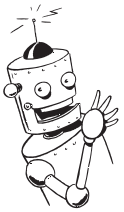
Label a coordinate system, write the formula, substitute and solve

$F_p =$

$f_f =$

$a =$

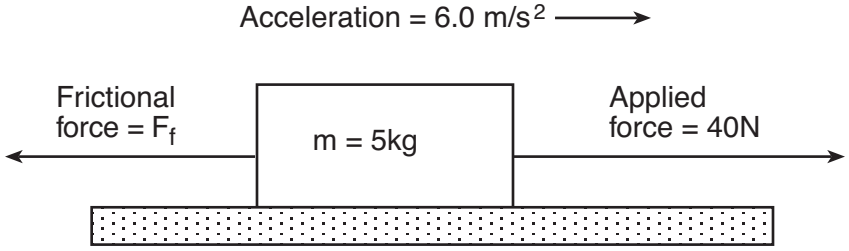
$m =$



a) _____ ← units

Chapter 5 Newton's Second Law

E5. A 5 kg crate is pushed across the floor with a force of 40 N towards the right. If the acceleration of the crate is 6.0 m/s², calculate the magnitude of the frictional force.



Label a coordinate system, write the formula, substitute and solve

$F_p =$

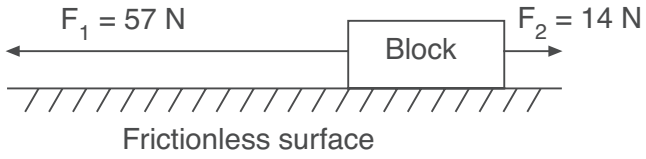
$f_f =$

$a =$

$m =$

a) _____ ← units

E6. Two forces, F_1 and F_2, are applied in opposite directions to a block on a frictionless, horizontal surface as shown below. If the magnitude of the block's acceleration is 4.3 m/s², calculate the mass of the block.



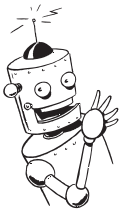
Label a coordinate system, write the formula, substitute and solve

$F_1 =$

$F_2 =$

$a =$

$m =$



a) _____ ← units

Chapter 5 Newton's Second Law

E7. A 225 kg crate is pushed along the floor by a monkey with a force of 710 N. If the coefficient of friction is 0.20 N/N, calculate the size of the frictional force and the acceleration of the crate.

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

$F_p =$

$f_f =$

$a =$

$m =$

a) _____ ◄—— units b) _____ ◄—— units

E8. A 50 kg crate, initially at rest, is pushed with a constant force of 280 N. If after 2 seconds the crate is traveling at 7 m/s, calculate the force of friction acting on the crate's motion.

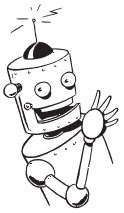
Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$F_p =$

$f_f =$

$a =$

$m =$



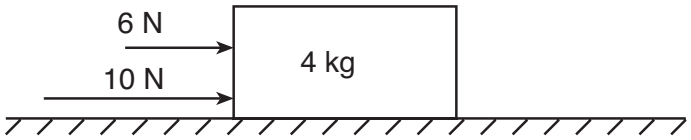
a) _____ ◄—— units

Name _____ Period _____ Date _____

Student Problems

5.3 Net Force

1. Two horizontal forces, 6 N and 10 N, are exerted in the same direction on a 74 kg crate as shown below. Find the net force and the acceleration of the crate.



Horizontal, frictionless surface

Label a coordinate system, write the formula, substitute and solve

$F_{net} =$

$F_1 =$

$F_2 =$

$a =$

$m =$

a) _____ ← units b) _____ ← units

2. Two horizontal forces, 6 N and 10 N, are exerted in opposite directions on a 4 kg crate as shown below. Find the net force and the acceleration of the crate.

Horizontal, frictionless surface

Label a coordinate system, write the formula, substitute and solve

$F_{net} =$

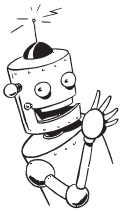
$F_1 =$

$F_2 =$

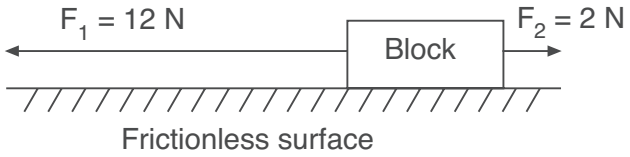
$a =$

$m =$

a) _____ ← units b) _____ ← units



3. Two forces, F_1 and F_2, are applied in opposite directions to a block on a frictionless surface as shown below. If the magnitude of the block's acceleration is 2.0 m/s², calculate the mass of the block.



Label a coordinate system, write the formula, substitute and solve

$F_1 =$

$F_2 =$

$a =$

$m =$

a) _____ ← units

4. Two forces are applied to a block on a frictionless, horizontal surface. A -65 N force is applied to one side of the block and a 71 N force is applied to the other side. If the magnitude of the block's acceleration is 1.6 m/s², calculate the mass of the block.

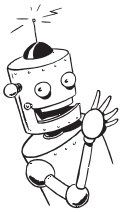
Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$F_1 =$

$F_2 =$

$a =$

$m =$

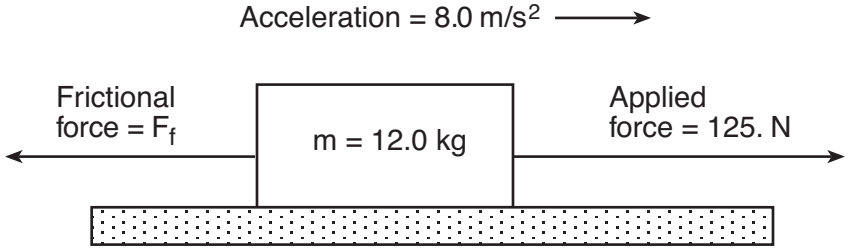


a) _____ ← units

Name _____ Period _____ Date _____

Chapter 5 Newton's Second Law

5. A 12 kg crate is pushed across the floor with a force of 125 N towards the right. If the acceleration of the crate is 8.0 m/s², calculate the magnitude of the frictional force.



Label a coordinate system, write the formula, substitute and solve

F_p =

f_f =

a =

m =

a) _____ ← units

6. A 100 kg crate is pushed across the floor by a force of 400 N causing the crate to accelerates at a rate of 2.5 8 m/s², calculate the magnitude of the frictional force?

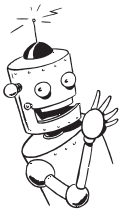
Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

F_p =

f_f =

a =

m =



a) _____ ← units

7. A 55 kg crate is pushed horizontally with a force of 220 N. If the coefficient of friction is 0.35, calculate the size of the frictional force and the acceleration of the crate.

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

$F_p =$

$f_f =$

$a =$

$m =$

a) _____ ⟵ units b) _____ ⟵ units

8. You have run out of gas on the highway so you and a buddy push your 2,000 kg car to the nearest gas station. If both you and your buddy each apply a force of 800 N (1,600 N total) and the coefficient of friction in the bearings of the car is 0.08 N/N, calculate the size of the frictional force and the acceleration of the car.

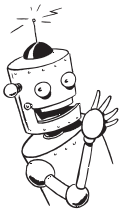
Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$F_p =$

$f_f =$

$a =$

$m =$



a) _____ ⟵ units b) _____ ⟵ units