

Name: _____ Date: _____

PHYSICS

Forces Review & Calculations

Part 1: Read the statements. Choose which option best describes forces or are the effects of forces.

- _____ 1. Which option best describes gravity force?
- A. Pull force & contact force
 - B. Pull force & action-at-a-distance force
 - C. Push force & contact force
 - D. Push force & action-at-a-distance force
- _____ 2. Which option best describes electrostatic force when a positively-charged object is near another positive-charged object?
- A. Pull force & contact force
 - B. Pull force & action-at-a-distance force
 - C. Push force & contact force
 - D. Push force & action-at-a-distance force
- _____ 3. Which option best describes electrostatic force when a positively-charged object is near a negatively-charged object?
- A. Pull force & contact force
 - B. Pull force & action-at-a-distance force
 - C. Push force & contact force
 - D. Push force & action-at-a-distance force
- _____ 4. Which option best describes buoyancy force?
- A. Pull force & contact force
 - B. Pull force & action-at-a-distance force
 - C. Push force & contact force
 - D. Push force & action-at-a-distance force
- _____ 5. Which option best describes tension force?
- A. Pull force & contact force
 - B. Pull force & action-at-a-distance force
 - C. Push force & contact force
 - D. Push force & action-at-a-distance force

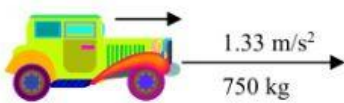
- _____ 6. Which option best describes magnetic fields when the north pole of one magnet is near the north pole of another magnet?
- A. Pull force & contact force
 - B. Pull force & action-at-a-distance force
 - C. Push force & contact force
 - D. Push force & action-at-a-distance force
- _____ 7. Which option best describes magnetic fields when the north pole of one magnet is near the south pole of another magnet?
- A. Pull force & contact force
 - B. Pull force & action-at-a-distance force
 - C. Push force & contact force
 - D. Push force & action-at-a-distance force
- _____ 8. Which option has the greatest inertia?
- A. 10 kg box
 - B. 20 kg box
 - C. 40 kg box
 - D. All have equal inertia
- _____ 9. Which option has the greatest inertia?
- A. 60 kg ball moving at 3 m/s.
 - B. 90 kg ball moving at 2 m/s.
 - C. 180 kg ball moving at 1 m/s.
 - D. All have equal inertia
- _____ 10. Which option has the greatest inertia?
- A. 60 kg ball moving at 3 m/s.
 - B. 60 kg ball moving at 6 m/s.
 - C. 60 kg ball moving at 9 m/s.
 - D. All have equal inertia
- _____ 11. Which option will require the most amount of force to accelerate it?
- A. 60 kg ball moving at 3 m/s.
 - B. 90 kg ball moving at 2 m/s.
 - C. 180 kg ball moving at 1 m/s.
 - D. All will require equal force.

- _____ 12 Which option will require the greatest amount of force to accelerate it?
- A. 60 kg ball moving at 3 m/s.
 - B. 60 kg ball moving at 6 m/s.
 - C. 60 kg ball moving at 9 m/s.
 - D. All will require equal force.
- _____ 13 Which option had the most force acting upon it?
- A. 20 kg car accelerating by 3.0 m/s^2 .
 - B. 20 kg car accelerating by 2.0 m/s^2 .
 - C. 20 kg car accelerating by 1.0 m/s^2 .
 - D. All had equal force acting upon them.
- _____ 14 Which option had the most force acting upon it?
- A. 20 kg car accelerating by 3.0 m/s^2 .
 - B. 30 kg car accelerating by 2.0 m/s^2 .
 - C. 60 kg car accelerating by 1.0 m/s^2 .
 - D. All had equal force acting upon them.
- _____ 15 Which is true about an applied force?
- A. Acts parallel to the surface and in the same direction as the motion.
 - B. Acts parallel to the surface and in the direction opposite of the motion.
 - C. Acts perpendicular to the surface.
 - D. Acts in the down direction towards the center of Earth's mass.
- _____ 16 Which is true about gravity force?
- A. Acts parallel to the surface and in the same direction as the motion.
 - B. Acts parallel to the surface and in the direction opposite of the motion.
 - C. Acts perpendicular to the surface and pushes back on the object.
 - D. Acts in the down direction towards the center of Earth's mass.
- _____ 17 Which is true about normal force?
- A. Acts parallel to the surface and in the same direction as the motion.
 - B. Acts parallel to the surface and in the direction opposite of the motion.
 - C. Acts perpendicular to the surface and pushes back on the object.
 - D. Acts in the down direction towards the center of Earth's mass.
- _____ 18 Which is true about friction force?
- A. Acts parallel to the surface and in the same direction as the motion.
 - B. Acts parallel to the surface and in the direction opposite of the motion.
 - C. Acts perpendicular to the surface and pushes back on the object.
 - D. Acts in the down direction towards the center of Earth's mass.

- _____ 19 What does friction force do to moving objects?
- A. Converts kinetic energy into potential energy.
 - B. Converts kinetic energy into heat.
 - C. Converts potential energy into kinetic energy.
 - D. Converts heat into potential energy.
- _____ 20 What does friction force do to objects?
- A. Makes moving objects go faster, or moves objects if they are initially motionless.
 - B. Changes objects from solid to liquid.
 - C. Makes objects move in the direction opposite that they already move.
 - D. Makes moving objects slow or stop, or keep objects motionless if they are initially motionless.
- _____ 21 What does applied force do to objects?
- A. Makes moving objects go faster, or moves objects if they are initially motionless.
 - B. Changes objects from solid to liquid.
 - C. Makes objects move in the direction opposite that they already move.
 - D. Makes moving objects slow or stop, or keep objects motionless if they are initially motionless.
- _____ 22 What is a free body diagram drawing?
- A. It shows all the forces that an object of reference puts on its surroundings.
 - B. It shows all the forces that an object of reference puts on another object.
 - C. It shows all the forces that an object of reference puts on its surroundings and all of the forces that are acting upon the object of reference.
 - D. It shows all the forces that are acting upon the object of reference.

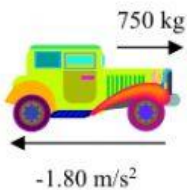
Part 2: Calculating Forces. Calculate force, acceleration, and mass. Use correct units. Type the correct answer into the small rectangle. Show calculations and work in the larger rectangle.

Force $F = m \cdot a$	Acceleration $a = \frac{F}{m}$	F = force (N) (net force) m = mass (kg) a = acceleration (m/s ²) $\vec{v}_0$ = initial velocity (m/s) $\vec{v}_f$ = final velocity (m/s)
Acceleration $a = \frac{\vec{v}_f - \vec{v}_0}{t}$	Mass $m = \frac{F}{a}$	



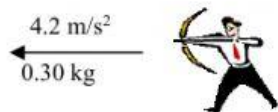
1. The motor of a car accelerates a car by 1.33 m/s². The mass of the car is 750 kg. Calculate the force of the motor causing the car to move.

Answer:



2. The brakes of a car accelerate the car by -1.80 m/s². The mass of the car is 750 kg. Calculate the force of the brakes causing the car to slow.

Answer:



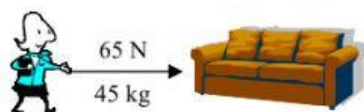
3. Tyrell is an expert archer. Tyrell's bow launches an arrow with an acceleration of 4.2 m/s². The mass of the arrow is 0.30 kg. Calculate the force of the bow launching the arrow.

Answer:



4. Jorge is a professional soccer player. Jorge kicks the soccer ball with a force of 11 N. The mass of the soccer ball is 1.25 kg. Calculate the acceleration experienced by the soccer ball.

Answer:



5. Alicia rearranged the furniture in her apartment. She pushed her sofa with a net force of 65 N. The mass of her sofa was 45 kg. Calculate the acceleration experienced by the sofa being pushed across the floor.

Answer:



6. A car was moving north on the freeway. It was traveling at 15 m/s. It got faster over 10 seconds time to have a final velocity of 45 m/s. The mass of the car was 1200 kg. Calculate the force of the motor accelerating the car. (Note, this is a two-step calculation).

Answer:



7. Steven was riding his bicycle very fast to get to school. He was moving at 16 m/s, but suddenly had to stop. He stopped his bike in 4.0 seconds. The mass of Steven + bike was 96 kg. Calculate the force of his brakes stopping the bike. (Note, this is a two-step calculation).

Answer:

Part 3: Forces Vocabulary. Drag and drop the vocabulary words into the correct blanks in the paragraph.

Acceleration	Contact	Gravity	Newtons	Resistance
Accelerate	Field	Inertia	Push	Vector

1. Forces are _____ or pull interactions between two or more objects.
2. Forces can be classified as _____ forces or action-at-a-distance forces.
3. Action at a distance forces are sometimes called _____ forces.
4. _____ is an example of an action-at-a-distance force because two objects do not need to touch in order to attract each other.
5. A force will cause an object to _____ or change their state of motion.
6. The units of force are _____, named after the famous English scientist who wrote about forces in *Philosophiae Principia Naturalis Mathematica*.
7. A force is a _____ because it needs both magnitude and direction to be correct.
8. Forces are calculated as the product of mass multiplied by _____.
9. The property of _____ is proportional to the object's mass.
10. Inertia is an object's _____ to acceleration. Objects want to keep their original states of motion.