Concept Items

4.1 Force 1.

What is dynamics?

a. Dynamics is the study of internal forces.
b. Dynamics is the study of forces and their effect on motion.
c. Dynamics describes the motion of points, bodies, and systems without consideration of the cause of motion.
d. Dynamics describes the effect of forces on each other.

2.

Two forces acting on an object are perpendicular to one another. How would you draw these in a free-body diagram?

a. The two force arrows will be drawn at a right angle to one another.
b. The two force arrows will be pointing in opposite directions.
c. The two force arrows will be at a 45° angle to one another.
d. The two force arrows will be at a 180° angle to one another.

3.

A free-body diagram shows the forces acting on an object. How is that object represented in the diagram?

a. A single point
b. A square box
c. A unit circle
d. The object as it is

4.2 Newton's First Law of Motion: Inertia 4.

A ball rolls along the ground, moving from north to south. What direction is the frictional force that acts on the ball?

a. North to south
b. South to north
c. West to east
d. East to west

5.

The tires you choose to drive over icy roads will create more friction with the road than your summer tires. Give another example where more friction is desirable.

a. Children's slide
b. Air hockey table
c. Ice-skating rink
d. Jogging track

6.

How do you express, mathematically, that no external force is acting on a body?

a. $F_{net} = -1$
b. $F_{net} = 0$
c. $F_{net} = 1$
d. $F_{net} = \infty$

4.3 Newton's Second Law of Motion 7.

What does it mean for two quantities to be inversely proportional to each other?

a. When one variable increases, the other variable decreases by a greater amount.
b. When one variable increases, the other variable also increases.
c. When one variable increases, the other variable decreases by the same factor.
d. When one variable increases, the other variable also increases by the same factor.

8.

True or False: Newton's second law can be interpreted based on Newton's first law.

a. True
b. False

4.4 Newton's Third Law of Motion 9.

Which forces cause changes in the motion of a system?

a. internal forces
b. external forces
c. both internal and external forces
d. neither internal nor external forces

10.

True or False—Newton's third law applies to the external forces acting on a system of interest.

a. True
b. False

11.

A ball is dropped and hits the floor. What is the direction of the force exerted by the floor on the ball?

a. upward
b. downward

c. right
d. left