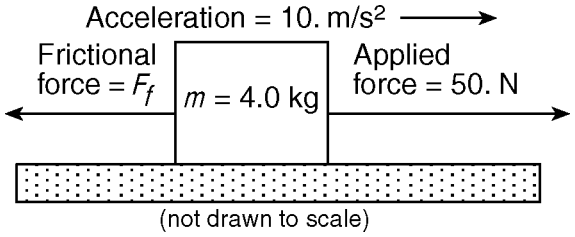
Name: _____
Regents Physics Section 4.3 Newton's 2nd Law

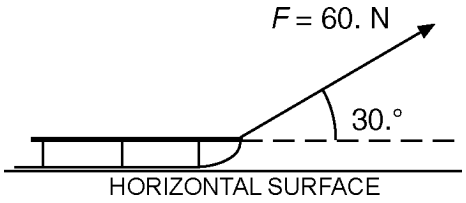
1) The diagram below shows a 4.0-kilogram object accelerating at 10. meters per second^2 on a rough horizontal surface.



What is the magnitude of the frictional force F_f acting on the object?

Questions 2 and 3 refer to the following:

A force of 60. newtons is applied to a rope to pull a sled across a horizontal surface at a constant velocity as shown below. The rope is at an angle of 30. degrees above the horizontal.

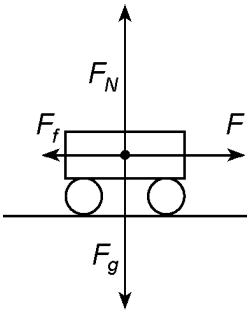


2) Using the given information, calculate the magnitude of the component of the 60.-newton force that is parallel to the horizontal surface. [*Show all work, including the equation and substitution with units.*]

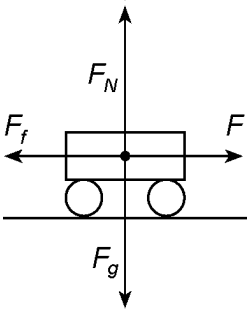
3) Using the given information, determine the magnitude of the frictional force acting on the sled.

4) Which vector diagram *best* represents a cart slowing down as it travels to the right on a horizontal surface?

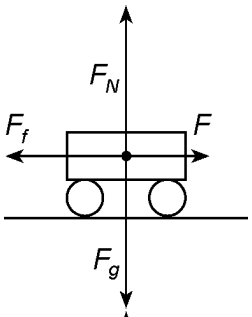
A)



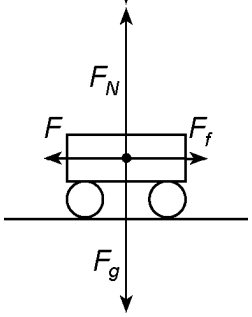
B)



C)



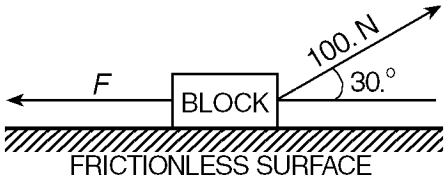
D)



5) If the sum of *all* the forces acting on a moving object is zero, the object will

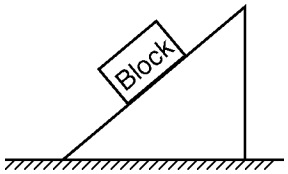
A) change the direction of its motion
B) accelerate uniformly
C) slow down and stop
D) continue moving with constant velocity

6) The diagram below shows a block on a horizontal frictionless surface. A 100.-newton force acts on the block at an angle of 30.° above the horizontal.



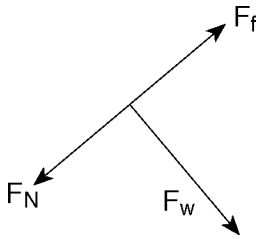
What is the magnitude of force *F* if it establishes equilibrium?

7) The diagram below represents a block at rest on an incline.

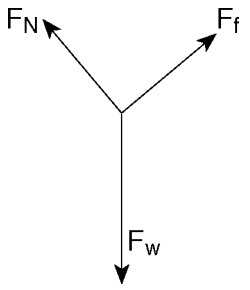


Which diagram *best* represents the forces acting on the block? (F_f = frictional force, F_N = normal force, and F_w = weight.)

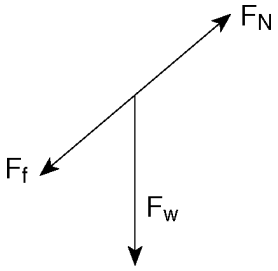
A)



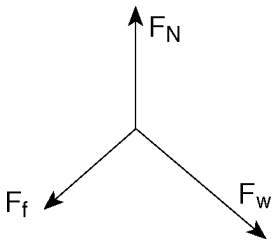
B)



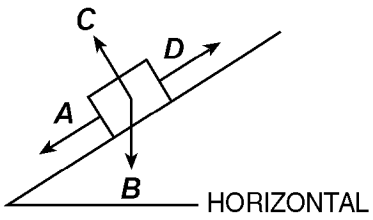
C)



D)



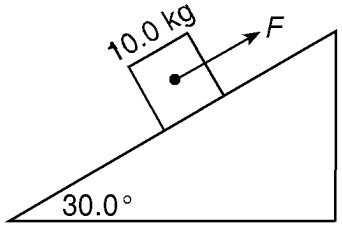
8) In the diagram below, a box is at rest on an inclined plane.



Which vector *best* represents the direction of the normal force acting on the box?

A) *A* B) *B* C) *C* D) *D*

9) The diagram below shows a 10.0-kilogram mass held at rest on a frictionless 30.0° incline by force *F*.



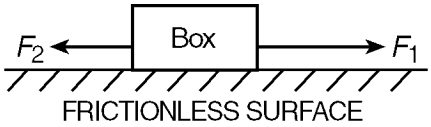
What is the approximate magnitude of force *F*?

10) In the diagram below, the upward drag force acting on a parachute is equal in magnitude but opposite in direction to the weight of the parachutist and equipment.

As a result of the forces shown, the parachutist may be moving

A) upward with constant acceleration
B) downward with decreasing speed
C) downward at constant speed
D) upward with decreasing speed

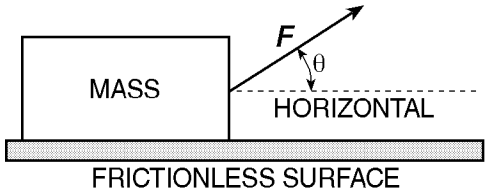
11) In the diagram below, a box is on a frictionless horizontal surface with forces F_1 and F_2 acting as shown.



If the magnitude of F_1 is greater than the magnitude of F_2, then the box is

A) accelerating in the direction of F_2
B) moving at constant speed in the direction of F_1
C) accelerating in the direction of F_1
D) moving at constant speed in the direction of F_2

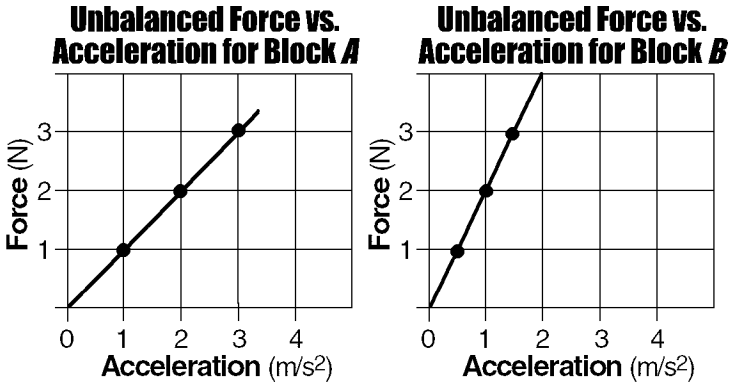
12) The diagram below shows a force of magnitude F applied to a mass at angle θ relative to a horizontal frictionless surface.



As angle θ is increased, the horizontal acceleration of the mass

A) remains the same
B) increases
C) decreases

13) A series of unbalanced forces was applied to each of two blocks, *A* and *B*. The graphs below show the relationship between unbalanced force and acceleration for each block.



Compared to the mass of block *A*, the mass of block *B* is

A) twice as great B) four times as great C) the same D) half as great

14) A net force of 10. newtons accelerates an object at 5.0 meters per second^2. What net force would be required to accelerate the same object at 1.0 meter per second^2?