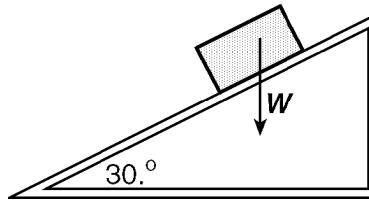
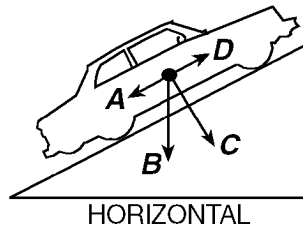


- 1) In the diagram below, the weight of a box on a plane inclined at $30.^\circ$ is represented by the vector W .



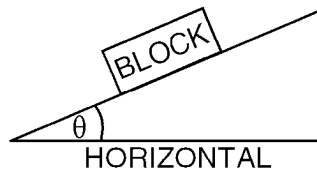
What is the magnitude of the component of the weight (W) that acts parallel to the incline?

- A) W B) $0.87W$ C) $1.5W$ D) $0.50W$
- 2) The diagram below represents a car resting on a hill.



Which vector *best* represents the weight of the car?

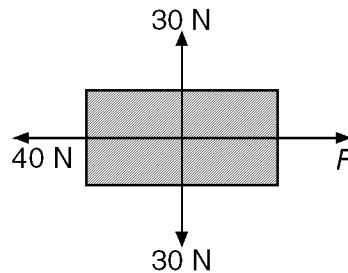
- A) A B) B C) C D) D
- 3) A block is at rest on an inclined plane as shown in the diagram below.



As angle θ is increased, the component of the block's weight parallel to the plane

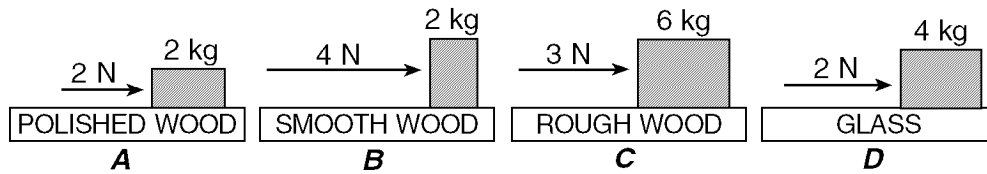
- A) decreases C) increases
B) remains the same
- 4) Two forces act on an object concurrently. The resultant will be *greatest* when the angle between the forces is
- A) 60° B) 0° C) 180° D) 90°
- 5) A force of 3 newtons and a force of 5 newtons act concurrently to produce a resultant of 8 newtons. The angle between the forces must be
- A) 90° B) 0° C) 60° D) 180°
- 6) The resultant of two forces acting on the same point at the same time will be *greatest* when the angle between the forces is
- A) 0° B) 180° C) 45° D) 90°

- 7) If two 10.-newton concurrent forces have a resultant of zero, the angle between the forces must be
- A) 45° B) 0° C) 180° D) 90°
- 8) As the angle between a force and level ground decreases from 60° to 30° , the vertical component of the force
- A) decreases C) remains the same
 B) increases
- 9) Four forces are acting on an object as shown in the diagram below.



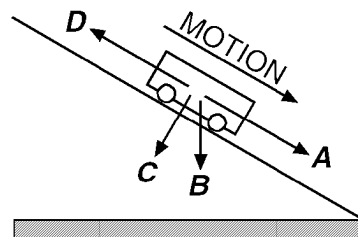
If the object is moving with a constant velocity, the magnitude of force F must be

- A) 20 N B) 0 N C) 40 N D) 100 N
- 10) Each diagram below shows a different block being pushed by a force across a surface at a constant velocity.



In which two diagrams is the force of friction the same?

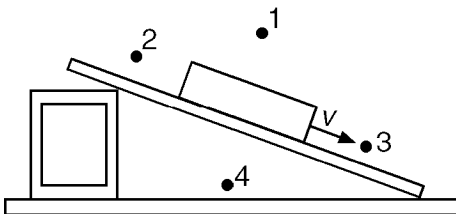
- A) C and D B) A and B C) A and D D) B and D
- 11) A cart rolls down an inclined plane with constant speed as shown in the diagram below.



Which arrow represents the direction of the frictional force?

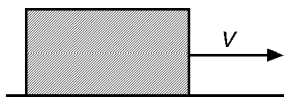
- A) A B) B C) C D) D

- 12) The diagram below represents a box shown sliding down an incline plane.



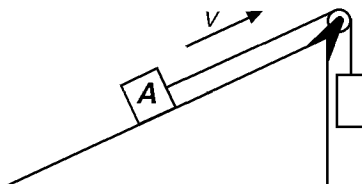
Toward which point will the force of friction on the box be directed?

- A) 1 B) 2 C) 3 D) 4
- 13) A box decelerates as it moves to the right along a horizontal surface, as shown in the diagram below.



Which vector *best* represents the force of friction on the box?

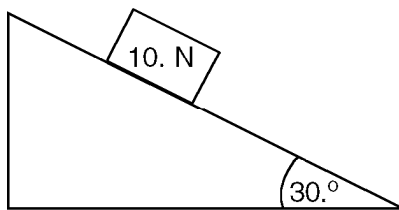
- A) B) C) D)
- 14) Block *A* is pulled with constant velocity up an incline as shown in the diagram below.



Which arrow *best* represents the direction of the force of friction acting on block *A*?

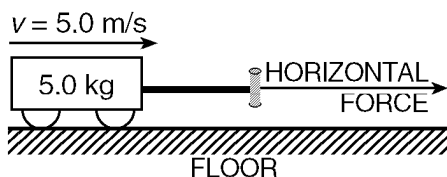
- A) B) C) D)
- 15) A constant unbalanced force of friction acts on a 15.0-kilogram mass moving along a horizontal surface at 10.0 meters per second. If the mass is brought to rest in 1.50 seconds, what is the magnitude of the force of friction?
- A) 147 N B) 10.0 N C) 150. N D) 100. N

- 16) The diagram below represents a 10.-newton block sliding down a $30.^\circ$ incline at a constant speed.



The force of friction of the block is approximately

- A) 98 N B) 49 N C) 5.0 N D) 10. N
- 17) A 100.-newton box rests on a horizontal surface. A force of 10 newtons parallel to the surface is required to start the box moving. What is the maximum coefficient of static friction between the box and the surface?
- A) 0.5 B) 1,000 C) 10 D) 0.1
- 18) A horizontal force is used to pull a 5.0-kilogram cart at a constant speed of 5.0 meters per second across the floor as shown in the diagram below.



If the force of friction between the cart and the floor is 10. newtons, the magnitude of the horizontal force along the handle of the cart is

- A) 10. N B) 50. N C) 5.0 N D) 25 N
- 19) The table below lists the coefficients of kinetic friction for four materials sliding over steel.

MATERIAL	μ_k
aluminum	0.47
brass	0.44
copper	0.36
steel	0.57

A 10.-kilogram block of each of the materials in the table is pulled horizontally across a steel floor at constant velocity. Which block would require the *smallest* applied force to keep it moving at constant velocity?

- A) copper B) steel C) aluminum D) brass