1) Which term represents a vector quantity?

   A) distance            B) power            C) work            D) force
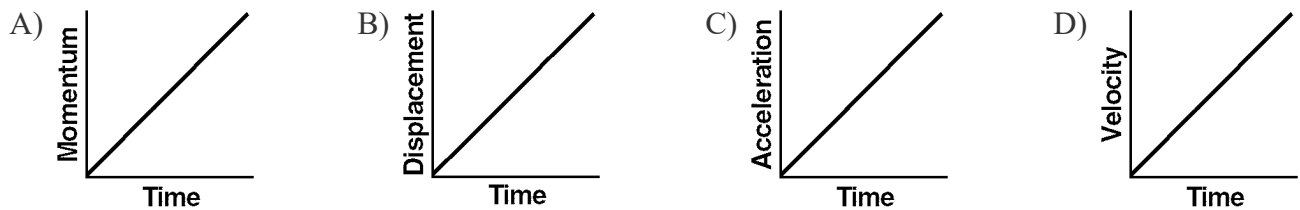
2) As the vector sum of *all* the forces acting on an object increases, the acceleration of the object

   C) decreases                         A) increases
   B) remains the same

3) A 60.-kilogram astronaut weighs 96 newtons on the surface of the Moon. The acceleration due to gravity on the Moon is

   A) 4.9 m/s$^2$          B) 9.8 m/s$^2$          C) 0.0 m/s$^2$          D) 1.6 m/s$^2$

4) Which graph *best* represents the motion of an object that has *no* unbalanced force acting on it?

   A) Momentum vs. Time          B) Displacement vs. Time          C) Acceleration vs. Time          D) Velocity vs. Time

5) Which diagram represents the vector with the *largest* downward component? [*Assume each vector has the same magnitude.*]

   A)                    B)                    C)                    D)

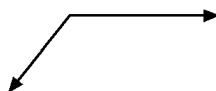   GROUND                GROUND                GROUND                GROUND

6) Which vector below represents the resultant of the concurrent vectors *A* and *B* in the diagram below?

   A                    B

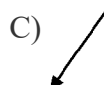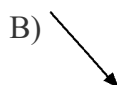   A)                    B)                    C)                    D)
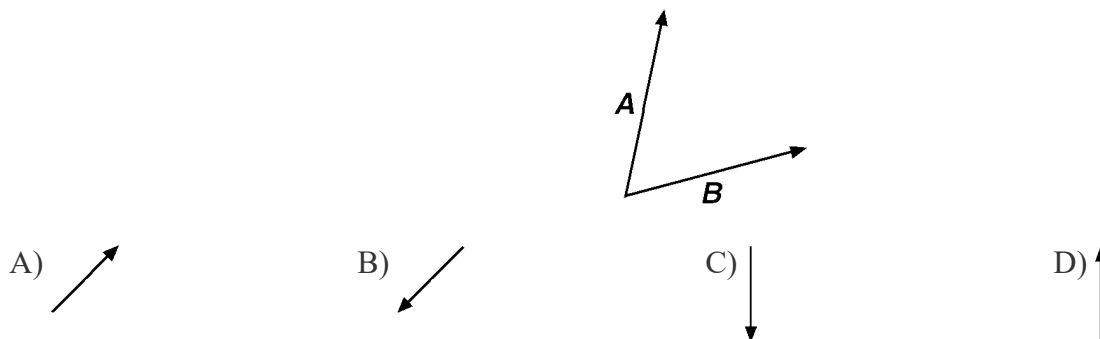
7) Which vector *best* represents the resultant of forces $F_1$ and $F_2$ acting concurrently on point $P$ as shown in the diagram below?

A) 

B) 

C) 

D) 
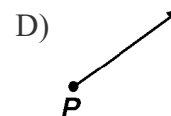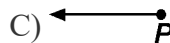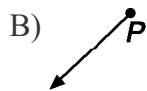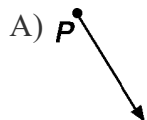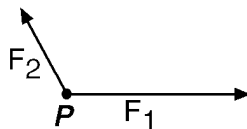
8) The diagram below represents two concurrent forces acting on a point.



Which vector *best* represents their resultant?

A) 

B) 

C) 

D) 
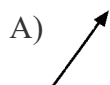
9) In the diagram below, the numbers 1, 2, 3, and 4 represent possible directions in which a force could be applied to a cart.
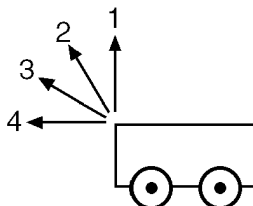


If the force applied in each direction has the same magnitude, in which direction will the vertical component of the force be the *least*?

A) 1          B) 2          C) 3          D) 4

10) A 3.0-newton force and a 4.0-newton force act concurrently on a point. In which diagram below would the orientation of these forces produce the *greatest* net force on the point?

A) 

B) 

C) 

D) 

11) A river flows due east at 1.5 meters per second. A ship leaves the north shore of the river and heads due south at 2.0 meters per second, as shown in the diagram below.



Which vector *best* represents the resultant velocity of the ship relative to the riverbank?

A) 3.5 m/s          B) 2.5 m/s          C) 2.0 m/s          D) 2.0 m/s

12) A boat heads directly eastward across a river at 12 meters per second. If the current in the river is flowing at 5.0 meters per second due south, what is the magnitude of the boat's resultant velocity?

A) 17 m/s          B) 8.5 m/s          C) 13 m/s          D) 7.0 m/s

13) A table exerts a 2.0-newton force on a book lying on the table. The force exerted by the book on the table is

A) 2.0 N          B) 20. N          C) 0.20 N          D) 0 N

14) Two forces ($\overrightarrow{OA}$ and $\overrightarrow{OB}$) act simultaneously at point $O$ as shown on the diagram below.



The magnitude of the resultant force is *closest* to

A) 15 N          B) 11 N          C) 16 N          D) 8.0 N