**Practice - Vectors**

**Name:** _____   **Date:** _____

1. Which is a vector quantity?

    A. distance   B. time

    C. mass   D. velocity

2. When two concurrent forces of 4 newtons and 10 newtons, respectively, act on a point, their maximum possible resultant is

    A. 14 newtons   B. 10 newtons

    C. 6 newtons   D. 4 newtons

3. A vector is a quantity that has

    A. magnitude, only

    B. direction, only

    C. either magnitude or direction

    D. both magnitude and direction

4. What is the magnitude of the resultant of a 3.0-meter displacement and a 4.0-meter displacement as shown in the diagram?

    A. 1.0 meter

    B. 5.0 meters

    C. 7.0 meters

    D. 12 meters

    4.0 meters / 3.0 meters

5. The maximum resultant of two forces acting on an object will occur when the angle between the forces is

   A. 180°   B. 90°   C. 45°   D. 0°
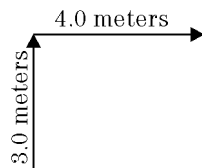
6. A resultant force of 10 newtons is made up of two complete component forces acting at right angles to each other. If the magnitude of one of the components is 6.0 newtons, the magnitude of the other component must be

    A. 16 N   B. 8.0 N   C. 6.0 N   D. 4 N

7. Two perpendicular forces act on an object as shown in the diagram. What is the magnitude of the resultant force on the object?

    A. 17 N   B. 13 N

   C. 7.0 N   D. 5.0 N

    5.0 N / 12 N
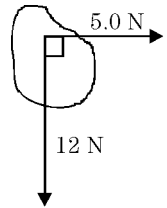
8. A student walks 1.0 kilometer due east and 1.0 kilometer due south. Then she runs 2.0 kilometers due west. The magnitude of the student's resultant displacement is closest to

    A. 0 km   B. 1.4 km

    C. 3.4 km   D. 4.0 km

9. Which combination of concurrent forces could *not* produce equilibrium?

    A. 10 N, 20 N, and 50 N

    B. 20 N, 30 N, and 50 N

    C. 30 N, 40 N, and 50 N

    D. 40 N, 40 N, and 50 N

10. Which pair of concurrent forces could produce a resultant force having a magnitude of 10 newtons?

    A. 10 N, 10 N   B. 10 N, 30 N

    C. 4.7 N, 4.7 N   D. 4.7 N, 5.0 N

11. A 100-newton force acts on point *P*, as shown in the diagram.
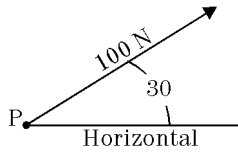
The magnitude of the vertical component of this force is approximately

A. 30 N   B. 50 N   C. 71 N   D. 87 N

12. Two students push on a sled. One pushes with a force of 30. newtons east and the other exerts a force of 40. newtons south, as shown in the topview accompanying diagram.
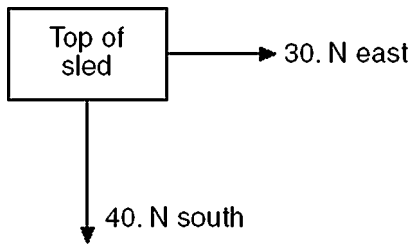
Which vector best represents the resultant of these two forces?

A.   70. N   B.   70. N

C.   50. N   D.   50. N

13. Which two terms represent a vector quantity and the scalar quantity of the vector's magnitude, respectively?

A. acceleration and velocity

B. weight and force

C. speed and time

D. displacement and distance

14. The diagram below represents a force vector, *A*, and a resultant vector, *R*.

Which force vector *B* below could be added to force vector *A* to produce resultant vector *R*?

A. B   B. B

C. B   D. B

15. Which is a vector quantity?

A. distance   B. speed

C. power   D. force

16. The diagram below represents two concurrent forces.

Which vector represents the force that will produce equilibrium with these two forces?

A.
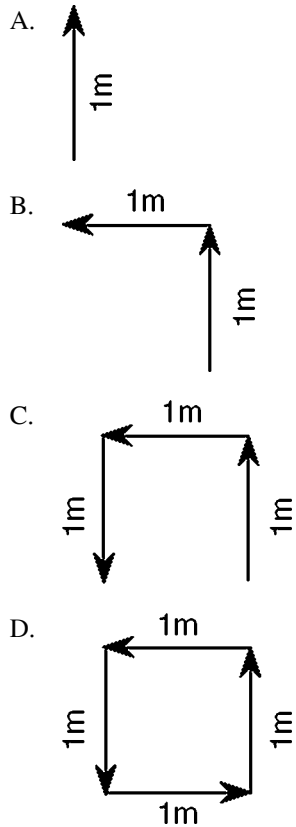
B.

C.

D.

17. A vector makes an angle, θ, with the horizontal. The horizontal and vertical components of the vector will be equal in magnitude if angle θ is

   A. 30°   B. 45°   C. 60°   D. 90°

18. Which vector diagram represents the greatest magnitude of displacement for an object?

   A.

   B.

   C.

   D.

19. Which vector best represents the resultant of forces $\vec{F}_1$ and $\vec{F}_2$ acting concurrently on point P, as shown in the diagram?

   A.   B.

   C.   D.
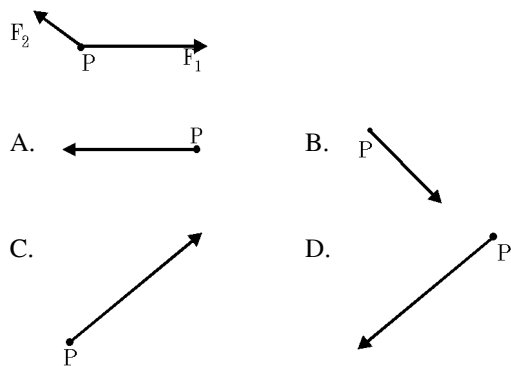
20. A 3.0-newton force and a 4.0-newton force act concurrently on a point. In which diagram shown would the orientation of these forces produce the greatest net force on the point?

   A.
   3.0 N
   4.0 N

   B.
   3.0 N
   4.0 N

   C.
   3.0 N
   4.0 N

   D.
   4.0 N
   3.0 N
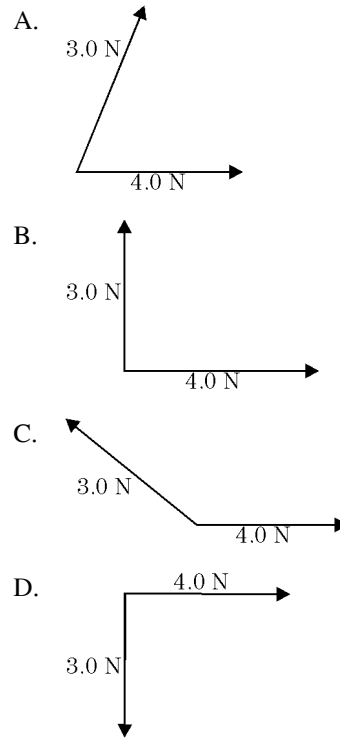
21. Which vector shown represents the resultant of the concurrent vectors A and B in the diagram given?

   A.

   B.

   C.

   D.

   A

   B
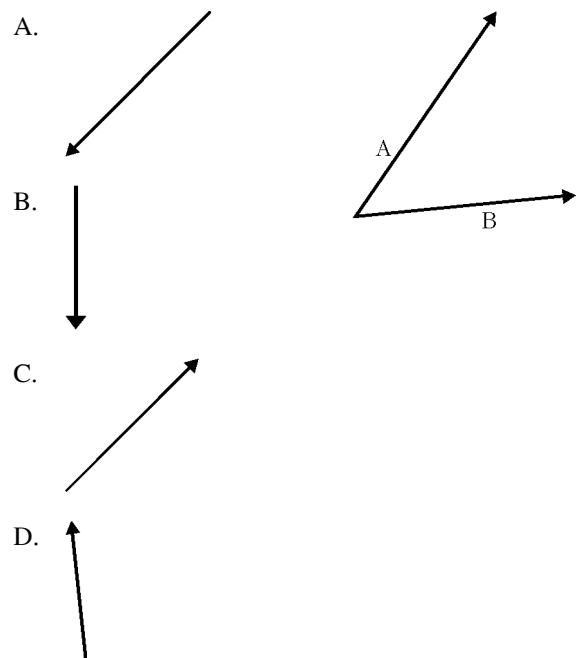
22. Base your answer to the following question on the information and vector diagram shown. The diagram is provided for practice purposes only.

A 20-newton force due north and a 40-newton force due east act concurrently on a 10-kilogram object, located at point *P*.
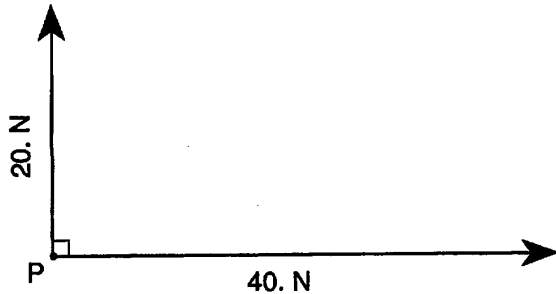
Using a ruler, determine the scale used in the vector diagram by finding the number of newtons represented by each centimeter.

23. On the vector diagram, use a ruler and protractor to construct the vector that represents the resultant force.

24. What is the magnitude of the resultant force?

25. What is the measure of the angle (in degrees) between east and the resultant force?

Practice - Vectors

Practice - Vectors   11/14/2018

1.
Answer: D

2.
Answer: A

3.
Answer: D

4.
Answer: B

5.
Answer: D

6.
Answer: B

7.
Answer: B

8.
Answer: B

9.
Answer: A

10.
Answer: A

11.
Answer: B

12.
Answer: D

13.
Answer: D

14.
Answer: A

15.
Answer: D

16.
Answer: C

17.
Answer: B

18.
Answer: B

19.
Answer: C

20.
Answer: A

21.
Answer: C

22.
Answer: 5.0 N (or equivalent)

23.
Answer: [diagram]

24.
Answer: 45 N (or equivalent)

25.
Answer: $27° +/- 2°$ (or equivalent)