Multiple Choice

Read each question and choose the best answer by putting the corresponding letter in the blank to the left.

_____ 1. Which of the following is a vector?

A. mass
B. **F**
C. *F*
D. temperature

_____ 2. Which is another way to write 90°?

A. 090T
B. 000T
C. 45° north of west
D. 425°

_____ 3. A canoe heads east at 9.00 km/h in a river that flows south at 4.00 km/h. What is the canoe's velocity relative to the earth?

A. 2.25 km/h
B. 5.00 km/h
C. 9.85 km/h
D. 13.0 km/h

_____ 4. What does the commutative property of vectors say?

A. Vectors can be transported.
B. Vectors can be inverted.
C. Vectors can be subtracted in any order.
D. Vectors can be added in any order.

_____ 5. Which is *not* true about similar triangles?

A Corresponding sides are proportional.
B. Angles determine similarity.
C. Sides are congruent.
D. Corresponding angles are congruent.

_____ 6. A hiker backpacks to a waterfall that is 1500 m east and 2 000 m north of his starting position. What is the magnitude of his displacement?

A. 500 m
B. 2 500 m
C. 3 500 m
D. 1323 m

_____ 7. Find the resultant of a vector whose component vectors are +6.50 m vertically and +9.60 m horizontally.

A. 11.5 m
B. 11.6 m
C. 11.0 m
D. 12.0 m

_____ 8. What is the approximate angle of the resultant vector in question 7?

A. 59°
B. 31°
C. 34°
D. 56°

_____ 9. Which is *not* true about a vector's magnitude?

A. It can never be negative.
B. It can never be larger than its component vectors.
C. It is a scalar quantity.
D. It always requires trigonometry to find it from the vector's components.

____ 10. Resolve the vector **L** into components L_x and L_y if the length of vector **L** is 15.0 m and the angle it makes with the horizontal is 20°.

A. L_x = +14.1 m, L_y = +5.13 m
B. L_x = +14.0 m, L_y = +5.00 m
C. L_x = +13.9 m, L_y = +5.10 m
D. L_x = +14.2 m, L_y = +5.20 m

Short Answer

After reading each sentence, write a response in the blank provided.

11. When illustrating vectors, the indicator of the direction of the vector is the _____ of the arrow.
12. When illustrating vectors, the indicator of the magnitude of the vector is _____of the arrow.
13. Two vectors are considered equal if they have the same _____.
14. How is the direction of a vector affected when it is multiplied by a scalar? _____

    _____

    _____
15. Two vectors that are added together to produce a resultant are called the _____ of the resultant.
16. The symbol for the angle used to determine the components of a vector is _____.

True/False

Read the following statements. Identify each as true or false by putting *T* or *F* in the blank to the left.

____ 17. The resultant is the same as the displacement.

____ 18. To find the resultant of any two vectors, simply add their magnitudes.

____ 19. Components are used in only two dimensions.

____ 20. In order to analyze a vector, a coordinate system is always required.

____ 21. The reference angle and vector angle may be the same value for a given vector.

____ 22. Reference angles are always positive.

____ 23. The perpendicular components of a two-dimensional vector may be negative, but the magnitude of the vector itself is always positive.

____ 24. For two vectors, **M** and **N**, $|\mathbf{M} + \mathbf{N}| = |\mathbf{M}| + |\mathbf{N}|$.

Application Problems

Solve or sketch the problems below. For problems that involve numbers, be sure to consider significant figures and appropriate units.

25. Consider two vectors, **R** and **M**, that have magnitudes of 6 and 9 respectively. Show the directions that the original vectors must point so that the following will be true:

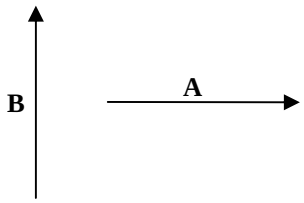
    A. $|\mathbf{R} + \mathbf{M}| = 15$

    B. $|\mathbf{R} + \mathbf{M}| = 3$

    C. $|\mathbf{M} - \mathbf{R}| = 3$

    D. $|\mathbf{M} - \mathbf{R}| = 15$

26. Use geometric techniques to perform geometric operations with **A** and **B**.



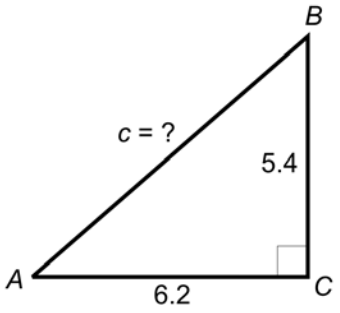
    A. **A** + **B**

B. **2A ✚ B**

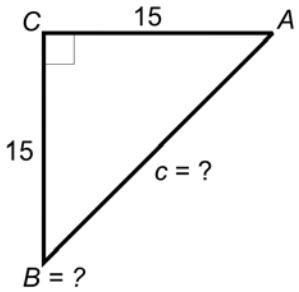
C. **4A ✚ 0B**

27. Solve the following right triangles for the indicated sides or angles.

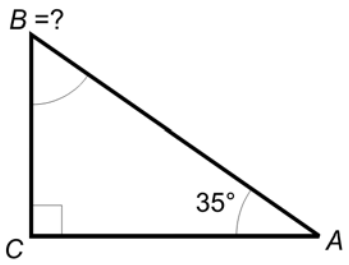
a. c = _____



b. B = _____ c = _____



c. B = _____



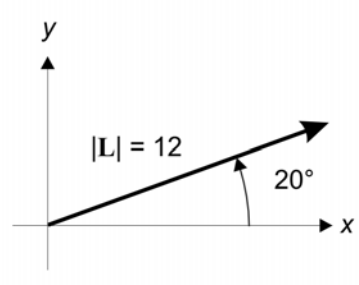
28. Resolve the following vectors into components.

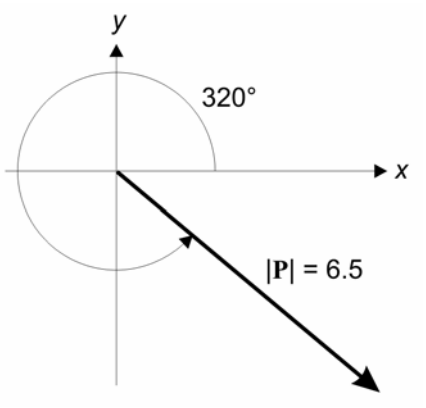
a. L_x = _____

L_y = _____

b. P_x = _____

P_y = ____





____ 29. Your science teacher lets you borrow his car so you can take your road test and get your license. You go 24.0 m/s north for 12.0 s and 11.0 m/s northwest for 56.0 s. What is your resultant displacement during the two intervals?

____ 30. You are at an activity where your youth group is playing tug-of-war, with the girls pulling against the guys. The girls pull to the right, and the guys pull to the left. If there are 18 girls who each can pull constantly with a pull of 500. N and there are 15 guys who can pull 575 N each, what is the resultant of the pull? Who will win the contest?