

**cq5-25**

1. CJ6 1.CQ.012. [310956] (a) Is it possible for one component of a vector to be zero, while the vector itself is not zero?

- yes  
 no

Explain.

(b) Is it possible for a vector to be zero, while one component of the vector is not zero?

- yes  
 no

Explain.

2. CJ6 1.CQ.013. [310988] Can two nonzero perpendicular vectors be added together so their sum is zero?

- yes  
 no

Explain.

3. CJ6 1.CQ.014. [311054] Can three or more vectors with unequal magnitudes be added together so their sum is zero?

- yes  
 no

If so, show by means of a tail-to-head arrangement of the vectors how this could occur. (Do this on paper. Your instructor may ask you to turn in this work.)

4. CJ6 1.CQ.015. [311058] In preparation for this question, review Conceptual Example 6. Vectors **A** and **B** satisfy the vector equation  $\mathbf{A} + \mathbf{B} = 0$ .

(a) How does the magnitude of **B** compare with the magnitude of **A**?

- magnitude of **B** > magnitude of **A**  
 magnitude of **B** < magnitude of **A**

- magnitude of **B** = magnitude of **A**
- (b) How does the direction of **B** compare with the direction of **A**?
- vectors **A** and **B** must point in opposite directions
  - vectors **A** and **B** must point in the same direction
  - vectors **A** and **B** must be perpendicular to each other

Give your reasoning.

5. CJ6 1.CQ.017. [311010] Vectors **A**, **B**, and **C** satisfy the vector equation  $\mathbf{A} + \mathbf{B} = \mathbf{C}$ , and their magnitudes are related by the scalar equation  $A + B = C$ . How is vector **A** oriented with respect to vector **B**?

- Vectors **A** and **B** must be perpendicular to each other.
- Vectors **A** and **B** must point in the same direction.
- Vectors **A** and **B** must point in the opposite directions.

Explain your reasoning.

6. CJ6 1.CQ.018. [310985] The magnitude of a vector has doubled. Can you conclude that the magnitude of each component of the vector has doubled?

- yes
- no
- not enough information to decide

Explain your answer.

7. CJ6 2.CQ.001. [310890] A honeybee leaves the hive and travels 2 km before returning. Is the displacement for the trip the same as the distance traveled?

- yes
- no
- not enough information to decide

Why or why not?

8. CJ6 2.CQ.002. [311036] Two buses depart from Chicago, one going to New York and one to San Francisco. Each bus travels at a speed of 30 m/s. Do they have equal velocities?

- yes
- no
- not enough information to decide

Explain.

9. CJ6 2.CQ.005. [310975] One of the following statements is incorrect. Which statement is incorrect?

- The car traveled around the track at a constant velocity.
- The car traveled around the track at a constant speed.

Why?

10. CJ6 2.CQ.007. [311069] At a given instant of time, a car and a truck are traveling side by side in adjacent lanes of a highway. The car has a greater velocity than the truck. Does the car necessarily have a greater acceleration?

- yes
- no
- not enough information to decide

Explain.

11. CJ6 2.CQ.008. [311009] The average velocity for a trip has a positive value. Is it possible for the instantaneous velocity at any point during the trip to have a negative value?

- yes
- no

not enough information to decide

Justify your answer.

12. CJ6 2.CQ.010. [310889] An object moving with a constant acceleration can certainly slow down. But can an object ever come to a permanent halt if its acceleration truly remains constant?

yes

no

not enough information to decide

Explain.

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