# Classroom Voting Questions: Multivariable Calculus

## 13.1 Displacement Vectors

1. The length of the sum of two vectors is always strictly larger than the sum of the lengths of the two vectors

   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

2. $||\vec{v}|| = |v_1| + |v_2| + |v_3|$, where $\vec{v} = v_1\vec{i} + v_2\vec{j} + v_3\vec{k}$.

   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

3. $\vec{v}$ and $\vec{w}$ are parallel if $\vec{v} = \lambda\vec{w}$ for some scalar $\lambda$

   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

4. Any two parallel vectors point in the same direction.

   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

5. Any two points determine a unique displacement vector.

(a) True, and I am very confident

(b) True, but I am not very confident

(c) False, but I am not very confident

(d) False, and I am very confident

6. $2\vec{v}$ has twice the magnitude as $\vec{v}$

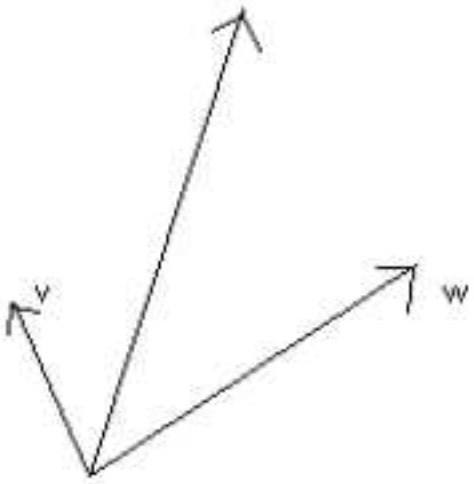
(a) True, and I am very confident

(b) True, but I am not very confident

(c) False, but I am not very confident

(d) False, and I am very confident

7. In the picture, the unlabelled vector is closest to




(a) $v + w$

(b) $v - w$

(c) $v + 2w$

(d) $2v + w$

8. A "unit vector" is a vector with a magnitude of one. The vectors $\hat{i} = \langle 1, 0, 0 \rangle, \hat{j} = \langle 0, 1, 0 \rangle$ and $\hat{k} = \langle 0, 0, 1 \rangle$ are unit vectors that point in the $x$, $y$, and $z$ directions, respectively.

**True or False:** The vector $\langle \frac{1}{2}, \frac{1}{2} \rangle$ is a unit vector.

(a) True, and I am very confident

(b) True, but I am not very confident

(c) False, but I am not very confident

(d) False, and I am very confident

9. **True or False:** The vector $\frac{1}{\sqrt{3}}\hat{i} - \frac{1}{\sqrt{3}}\hat{j} + \frac{2}{\sqrt{3}}\hat{k}$ is a unit vector.

(a) True, and I am very confident

(b) True, but I am not very confident

(c) False, but I am not very confident

(d) False, and I am very confident

10. Which of the following is a unit vector that is parallel to the vector $\langle 1, -2, 3\rangle$?

(a) $\langle \frac{1}{6}, -\frac{2}{6}, \frac{3}{6}\rangle$

(b) $\langle \frac{1}{\sqrt{14}}, -\frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}\rangle$

(c) $\langle \frac{1}{14}, -\frac{2}{14}, \frac{3}{14}\rangle$

(d) $\langle -\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, -\frac{3}{\sqrt{14}}\rangle$

(e) More than one of the above

11. The vectors $2\hat{i} - \hat{j} + \hat{k}$ and $\hat{i} - 2\hat{j} + \hat{k}$ are parallel.

(a) True, and I am very confident

(b) True, but I am not very confident

(c) False, but I am not very confident

(d) False, and I am very confident

12. Find a vector that points in the same direction as the vector $\langle 2, 1, 2\rangle$, but has a magnitude of 5.

(a) $\langle \frac{10}{3}, \frac{5}{3}, \frac{10}{3}\rangle$

(b) $\langle \frac{10}{\sqrt{3}}, \frac{5}{\sqrt{3}}, \frac{10}{\sqrt{3}}\rangle$

(c) $\langle \frac{5}{\sqrt{3}}, \frac{5}{\sqrt{3}}, \frac{5}{\sqrt{3}}\rangle$

(d) $\langle 10, 5, 10\rangle$

(e) $\langle 30, 15, 30\rangle$

(f) More than one of the above