

# Math 233 - Quiz 2

January 27, 2022

Name \_\_\_\_\_

Score \_\_\_\_\_

This quiz is available in Canvas. It is due February 1.

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- (1 point) What is the 3rd component of the projection of  $\vec{b} = 2\hat{i} - 3\hat{j} + \hat{k}$  onto  $\vec{a} = 3\hat{i} + 4\hat{j} - 6\hat{k}$ ?
  - 72/61
  - 12/61
  - 36/7
  - 6/7
  
- (1 point) Let  $\vec{v} = -2\hat{i} + \frac{3}{2}\hat{j} - 7\hat{k}$ . For which one of the vectors below is it true that  $\vec{v} \times \vec{w} = \vec{0}$ ?
  - $\vec{w} = \hat{i} + \hat{k}$
  - $\vec{w} = 8\hat{i} - 6\hat{j} + 28\hat{k}$
  - $\vec{w} = -2\hat{i} + 3\hat{j} - 7\hat{k}$
  - $\vec{w} = 3\hat{j}$
  
- (2 points) The vector  $\vec{w}$  is orthogonal to both  $\vec{u} = \hat{i} + 2\hat{j} - \hat{k}$  and  $\vec{v} = -3\hat{i} - \hat{j} + \hat{k}$ . Furthermore, the 1st component of  $\vec{w}$  is  $-2$ . What is the 2nd component of  $\vec{w}$ ?
  - 2
  - 4
  - 8
  - Not enough information to tell
  
- (2 points) Determine the volume of the parallelepiped determined by the vectors  $\vec{x} = \langle 1, 2, -1 \rangle$ ,  $\vec{y} = \langle 0, -1, 1 \rangle$ , and  $\vec{z} = \langle 1, 3, 0 \rangle$ .
  - 2
  - 2
  - $2\sqrt{7}$
  - $\sqrt{62}$

5. (2 points) A line passes through the points  $P(2, 3, -1)$  and  $Q(-5, 6, 2)$ . Which one of these is an additional point on that same line?

- (a)  $(-2, -3, 1)$
- (b)  $(-7, 3, 3)$
- (c)  $(-3, 9, 1)$
- (d)  $(23, -6, -10)$

6. (1 point) A line is defined by the symmetric equations  $\frac{x+3}{2} = \frac{y-7}{4} = 8-z$ . Which one of these vectors is parallel to the line?

- (a)  $2\hat{i} + 4\hat{j} - \hat{k}$
- (b)  $-3\hat{i} + 7\hat{j} + 8\hat{k}$
- (c)  $2\hat{i} + 4\hat{j} + \hat{k}$
- (d)  $2\hat{i} + 4\hat{j}$

7. (1 point) A line is defined by the parametric equations shown here. Which vector below is parallel to the line?

$$x = -9 + 3t$$

$$y = 7 + 2t$$

$$z = 8 - 4t$$

- (a)  $\langle 3, 2, 4 \rangle$
- (b)  $\langle 9, -7, -8 \rangle$
- (c)  $\langle 1, 1, 1 \rangle$
- (d)  $\langle 6, 4, -8 \rangle$