

Time Limit: 3.5 minutes**Instructions:** Open book, notes. Calculator allowed.Instructions for all quizzes: Do not discuss any aspect of this quiz with other midshipmen until after 6th period.

Print your last name above. Also, fill in the bubble for your section.

Fill the bubble for the correct answer. Write your answers in any blanks provided.

Your work will not be graded unless requested.

1. Find the length of $\langle 2, -2, 1 \rangle$.

- 1 5 $\sqrt{5}$ 3 9

$$|\langle 2, -2, 1 \rangle| = \sqrt{2^2 + (-2)^2 + 1^2} = \sqrt{9} = 3$$

2. Find the vector \mathbf{PQ} , where $P = (1, 2, -3)$ and Q is the center of the sphere

$$(x - 5)^2 + (y - 3)^2 + (z - 7)^2 = 12.$$

$$\underline{\mathbf{PQ} = \langle 4, 1, 10 \rangle}.$$

The center of the sphere is $P = (5, 3, 7)$.So $\mathbf{PQ} = \langle 5 - 1, 3 - 2, 7 - (-3) \rangle = \langle 4, 1, 10 \rangle$.3. Fill in the bubble for **every** unit vector.

A unit vector has length 1.

Let us compute the length of each vector, and see which ones have length 1.

$\langle 2, -2, 1 \rangle$ $|\langle 2, -2, 1 \rangle| = 3$

$\langle 1, 1 \rangle$ $|\langle 1, 1 \rangle| = \sqrt{2}$

$\frac{1}{2}\mathbf{i} + \frac{1}{2}\mathbf{j}$ $|\frac{1}{2}\mathbf{i} + \frac{1}{2}\mathbf{j}| = \sqrt{(1/2)^2 + (1/2)^2} = \sqrt{1/2}$

$-\mathbf{k}$ $|-\mathbf{k}| = |\langle 0, 0, -1 \rangle| = 1$

$\mathbf{0}$ $|\mathbf{0}| = 0$

$\langle \cos(\theta), \sin(\theta) \rangle$ $|\langle \cos(\theta), \sin(\theta) \rangle| = \sqrt{\cos^2(\theta) + \sin^2(\theta)} = 1$