Guest Student
WeBWorK assignment 13.2-Vectors
Due: 09/18/2007 at 10:00pm EDT

UMass Boston
Math 240 - Calculus III
Fall 2007

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1. (1 pt) Suppose $\overline{u} = -3i - 2j$, $\overline{v} = -3i - 3j - 2k$ and $\overline{w} = -5j + 2k$.
Compute the following values:

$|\overline{u}| + |\overline{v}|$ = _____

$|-5\overline{u}| + 5|\overline{v}|$ = _____

$|2\overline{u} - 4\overline{v} + \overline{w}|$ = _____

$\frac{1}{|\overline{w}|}\overline{w}$ = _____

$\left|\frac{1}{|\overline{w}|}\overline{w}\right|$ = _____

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2. (1 pt) Find **unit** vectors that satisfy the given conditions:

(1) The unit vector in the same direction as $\langle -1, 5\rangle$ is _____.

(2) The unit vector oppositely directed to $-i - 2j + 2k$ is _____.

(3) The unit vector that has the same direction as the vector from the point $A = (2, 4)$ to the point $B = (-1, 9)$ is _____.

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3. (1 pt) Suppose $\overline{u} = \langle -1, -1\rangle$ and $\overline{v} = \langle 2, 0\rangle$ are two vectors that form the sides of a parallelogram. Then the lengths of the two diagonals of the parallelogram are _____ and _____.

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4. (1 pt) Consider the vector $\overline{v}$ between $(-1, -4, 2)$ and $(8, 8, -5)$.

(1) The vector $\overline{v}$ is _____.

(2) The length of $\overline{v}$ is _____.

(3) If the tail of $\overline{v}$ is at $(0, 4, -5)$, then the tip is at _____.

(4) If the tip of $\overline{v}$ is at $(-4, 2, 2)$ then its tail is at _____.

(5) What vector has the same length as $\overline{v}$, but points in the opposite direction? _____.

(6) What vector has the same direction as $\overline{v}$, but is twice as long? _____.

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5. (1 pt) Suppose $\overline{u} = \langle -3, 2, 5\rangle$ and $\overline{v} = \langle 5, 5, 5\rangle$. Then:

$\overline{u} + \overline{v}$ = _____

$\overline{u} - \overline{v}$ = _____

$\overline{v} - \overline{u}$ = _____

$8\overline{u}$ = _____

$-\frac{1}{3}\overline{v}$ = _____

$8\overline{u} - 6\overline{v}$ = _____

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6. (1 pt)
Let $\mathbf{a} = \langle 5, -4, 1\rangle$ and $\mathbf{b} = \langle -2, 3, -3\rangle$.
Compute:
$\mathbf{a} + \mathbf{b}$ = (____, ____, ____)
$\mathbf{a} - \mathbf{b}$ = (____, ____, ____)
$2\mathbf{a}$ = (____, ____, ____)
$3\mathbf{a} + 4\mathbf{b}$ = (____, ____, ____)
$|\mathbf{a}|$ = _____

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7. (1 pt)
Let $\mathbf{a} = \langle -5, 3, -2\rangle$ and $\mathbf{b} = \langle 4, 1, -2\rangle$.
Show that there are scalars s and t so that $s\mathbf{a} + t\mathbf{b} = \langle 17, 0, -4\rangle$
You might want to sketch the vectors to get some intuition.
s = _____
t = _____

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8. (1 pt)
A child walks due east on the deck of a ship at 5 miles per hour.
The ship is moving north at a speed of 7 miles per hour.
Find the speed and direction of the child relative to the surface of the water.
Speed = _____ mph
The angle of the direction from the north = _____ (radians)