Assignment 23: Vectors (10.1-5) **Name______________________**
Please provide a handwritten response.

1a. Vectors are readily represented on your calculator. You enter them as follows:

	TI-83 Plus/TI-84 Plus	**TI-86**
ENTERING VECTORS	Press **2ND** x^{-1} **(MATRIX)** **EDIT** and choose a matrix. Depending on size enter either $\mathbf{1\times 2}$ or $\mathbf{1\times 3}$ for the dimensions. Then edit the entries to the desired numbers.	Press **2ND 8 (VECTOR)** To enter a vector press **F2 EDIT** Enter a name (**A,B,C,…**) for the vector and press **ENTER** Enter a dimension (2 or 3) and press enter. Then edit the entries to the desired numbers.
VECTOR ARITHMETIC	From the homescreen you can enter **3[A]** for scalar multiplication **([A]** came from the matrix names menu) or **2[A]-3[B]** for vector addition.	From the home screen you can enter **3A** for scalar multiplication or **2A-3B** for vector addition.

Calculate $5\vec{A}-3\vec{B}$ when $\vec{A}=\langle 3,-2\rangle$ and $\vec{B}=\langle 4,1\rangle$ and record the result below.

Vector operations can readily be done on your calculator.

	TI-83 Plus/TI-84 Plus	**TI-86**
VECTOR OPERATIONS	Run the program **VECTOR** following the prompts. Enter vector dimension (**2** or **3**) Enter the vectors being used. When the vector operations menu appears choose the appropriate option	Once the vectors are entered choose **F3 (MATH)** and choose the appropriate option. Syntax: **cross(** $\vec{A},\vec{B}$ **)** **dot(** $\vec{A},\vec{B}$ **)** **norm** $\vec{A}$ **unitV** $\vec{A}$

1b. Calculate $\vec{A}\cdot\vec{B}$ and record the result below.

1c. Calculate the magnitude of the vector $\vec{A}$, $\|\vec{A}\|$, and record the result below.

2a. For $\vec{C}=\langle 4,-1,7\rangle$, $\vec{D}=\langle 3,3,-5\rangle$ calculate $4\vec{C}+\vec{D}$ and $(4\vec{C}+\vec{D})\cdot\vec{C}$. Record the results below.

2b. Evaluate $\vec{A}\cdot\vec{C}$ and record the result below. What do you think the problem is?

2c. Evaluate the cross product, $\vec{C} \times \vec{D}$ and record the result below. Are $\vec{C}$ and $\vec{D}$ parallel?

3. Given $\vec{A} = \langle -1, 0, 2 \rangle$ parallel to $\begin{cases} x = 3 - t \\ y = 4 \\ z = -2 + 2t \end{cases}$ and $\vec{B} = \langle 2, -3, 1 \rangle$ parallel to

$\begin{cases} x = 1 + 2s \\ y = 7 - 3s \\ z = -3 + s \end{cases}$.

Find $\vec{A} \cdot \vec{B}$ and $\vec{A} \times \vec{B}$. Are the lines parallel, perpendicular or neither?

4a. Define $\vec{A}$ and $\vec{B}$ to be vectors parallel to $\begin{cases} x = 3 + t \\ y = 3 + 3t \\ z = 4 - t \end{cases}$ and $\begin{cases} x = 2 - s \\ y = 1 - 2s \\ z = 6 + 2s \end{cases}$. Use the cross product to show that the lines are not parallel. They are either skew or intersect. Record the cross product below.

4b. To find the point of intersection you will need to set $x = x, y = y, z = z$ and solve the resulting equations simultaneously for s and t. Find the point of intersection for **4a.** Be sure to give the point in space, (x, y, z), not just values for s and t.

4c. Repeat **4a** with the lines $\begin{cases} x = 1 - 2t \\ y = 2t \\ z = 5 - t \end{cases}$ and $\begin{cases} x = 3 + 2s \\ y = -2 \\ z = 3 + 2s \end{cases}$.