Assignment 24: Vectors (10.1-5) **Name**_____
Please provide a handwritten response.

1a. Vectors are readily represented on your calculator. You enter them using the **2nd** , **([ )** and **2nd ÷ ( ]).** Enter $\vec{A} = \langle 3, -2 \rangle$ as **[3,-2]→a** and $\vec{B} = \langle 4, 1 \rangle$ as **[4,1]→b**.

Vector operations can readily be done on your calculator. You can access them from **2nd 5 (MATH) 4 (Matrix) L (Vector ops)** on the TI-89 or **Option F** on the Voyage 200.

1b. Calculate $\vec{A} \cdot \vec{B}$ by entering **dotP(a,b)** and record the result below.

1c. Calculate the magnitude of the vector $\vec{A}$, $\left\| \vec{A} \right\| = \sqrt{a_1^2 + a_2^2}$. Use **2nd 5 (MATH) 4 (Matrix) H (Norms) 1 norm(** 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 $\left(4\vec{C} + \vec{D}\right) \cdot \vec{C}$. 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 $\begin{cases} x = 3 + 2s \\ y = -2 \\ z = 3 + 2s \end{cases}$.