Math 241, Fall 2006, Merit Worksheet 1

Welcome!

1. Do you remember ...?
   (a) \( \frac{d}{dx} (x \sin 7x^3) \)
   (b) \( \int_0^1 (x + 1)e^{x^2+2x} \, dx \)
   (c) \( \int_{\pi/2}^{\pi} x \sin x \, dx \)

2. List 5 things best described by using scalars and 5 things best described by using vectors.

3. A line segment starts at (2, −7) and has midpoint (5, −1). What is the other endpoint of the line segment?

4. A line segment starts at (1, 3) and ends at (4, 7). Where would it end if it were 5 times longer?

5. Given the vectors \( \mathbf{b} = < 1, 1 > \) and \( \mathbf{c} = < -1, 2 > \), for the following vectors \( \mathbf{a} \), find \( s \) and \( t \) such that \( \mathbf{a} = s \mathbf{b} + t \mathbf{c} \).
   (a) \( \mathbf{a} = < 0, 6 > \)
   (b) \( \mathbf{a} = < -3, 6 > \)
   (c) \( \mathbf{a} = < 0, 0 > \)
   (d) Choose your own vector \( \mathbf{a} \).
   (e) What does this tell you about any vector \( \mathbf{a} \) in \( \mathbb{R}^2 \)?

6. If \( \mathbf{a}, \mathbf{b} \) and \( \mathbf{c} \) are the vertices of a triangle, find \( \vec{a}\vec{b} + \vec{b}\vec{c} + \vec{c}\vec{a} \).

Warm-Up problems for Tuesday

1. What is the distance between \((-1, 3, 7)\) and \((2, -1, 19)\)?

2. What is \( ||7\mathbf{i} + 9\mathbf{j} - 9\mathbf{k}|| \)?