Question Set 2

CS 420

Chapter 2

1. Identify the types (basis, coordinate vector, matrix, point, vector) of the variables in this equation
$$\vec{v} = \vec{\mathbf{b}}^t M^{-1}\mathbf{c}$$

2. Draw a figure corresponding to
$$\vec{\mathbf{b}}^t\mathbf{c} \Rightarrow \vec{\mathbf{b}}^t M\mathbf{c}$$
and express this mathematical statement in words.

3. Draw a figure corresponding to
$$\vec{\mathbf{b}}^t \Rightarrow \vec{\mathbf{b}}^t M$$
and express this mathematical statement in words.

4. How is the vector
$$\vec{v} \times \vec{w}$$
related to the two vectors in the expression? Draw a figure corresponding to this.

5. Which of the following are valid expressions in our notation and, if valid, what is the resulting type (invalid, basis, coordinate vector, matrix, point, vector)
   (a) $\vec{\mathbf{b}}^t M$
   (b) $\mathbf{c}M$
   (c) $M^{-1}\mathbf{c}$
   (d) $\vec{\mathbf{b}}^t N M^{-1}\mathbf{c}$

6. Given that $\vec{\mathbf{a}}^t = \vec{\mathbf{b}}^t M$, what are the coordinates of the vector $\vec{\mathbf{b}}^t N\mathbf{c}$ with respect to the basis $\vec{\mathbf{a}}^t$? (Your answer will be a mathematical expression.)