Capital Crimes in Calculus III

The following are capital offenses in Calculus III.

- 1. Equating a vector and a scalar. (In this list of crimes, "vector" always means a vector in 2-space, 3-space, or higher-dimensional space.) Some special cases and examples of this unspeakable act are:
 - (a) Equating a vector with the norm of a vector.
 - (b) Taking the norm of a vector, and getting a vector as the answer.
 - (c) " $7\mathbf{i} 6\mathbf{j} + 2\mathbf{k} = 3$," as if $7\mathbf{i} 6\mathbf{j} + 2\mathbf{k}$ were the same thing as 7 6 + 2.
- 2. Taking the norm of a vector, and getting a negative number as the answer.
- 3. Treating a comma as a plus-sign, or vice versa. (Example: writing " $\langle 2\mathbf{i}, 3\mathbf{j}, 4\mathbf{k} \rangle$ " instead of $2\mathbf{i} + 3\mathbf{j} + 4\mathbf{k}$ or $\langle 2, 3, 4 \rangle$.)
- 4. Adding two vectors, and getting a scalar as the answer.
- 5. Putting a "greater than" or "less than" symbol between two vectors.
- 6. Juxtaposing two vectors (e.g. writing "**ab**", where **a** and **b** are vectors), with no operation-symbol in between (e.g. $\cdot, \times, +, -$).
- 7. Squaring a vector.
- 8. Dividing by a vector.
- 9. Writing a fraction whose denominator is a vector.
- 10. Taking the dot-product of two vectors, and getting a vector as the answer.
- 11. Taking the cross-product of two vectors in any dimension other than three.
- 12. Taking the cross-product of two vectors, and getting a scalar as the answer.