## 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 $\mathbf{a}$ and $\mathbf{b}$ 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.
