Math 232 Spring 2006 Project 10

Due April 14

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Name

Be sure to re-read the WRITING GUIDELINES rubric, since it defines how your project will be graded. In particular, you may discuss this project with others but **you may not collaborate on the written exposition of the solution.**

"The road to wisdom? Well it plain and simple to express: Err and err and err again, but less and less and less." -Piet Hein, poet and scientist (1905-1996)

Project Problem

Suppose A is an invertible matrix of size n. Prove that $\overline{(A^{-1})} = \left(\overline{A}\right)^{-1}$. [I suggest you review the proof that $\left(A^t\right)^{-1} = \left(A^{-1}\right)^t$ for an invertible matrix.]

$(1/3)^{2/3}(2/3-5) = -2.083\,249\,379$

$x^{2/3}(2x-5)$

Solution: $\frac{2}{3\sqrt[3]{x}}(2x-5) + 2x^{\frac{2}{3}} = \frac{10}{3}\frac{x-1}{\sqrt[3]{x}} = \frac{10}{3}\frac{x-1}{\sqrt[3]{x}}$ Solution: $\frac{10}{3\sqrt[3]{x}} - \frac{10}{9}\frac{x-1}{\sqrt[3]{x}x} = \frac{10}{9}\frac{2x+1}{x^{\frac{4}{3}}}$

Do Not Turn These Problems In

The first question is an excellent check to see if you have an appropriate understanding of the basics of vector spaces. The easiest way to do the second problem is to start with a basis of V, extend that basis to a basis of U and then use Gram-Schmidt on that basis of U. At no time will you have to do any computations from Gram-Schmidt – but you will want to cite the result.

1. Let V be a subspace of the vector space U and define $V^{\perp} = \{\vec{w} \in U : \text{ for each } \vec{v} \in V, \ < \vec{w}, \vec{v} > \ = 0\}$. Show that $V^{\perp}$ is a subspace of U.
2. If $\dim(U) = n$ and $\dim(V) = p$, then $\dim\left(V^{\perp}\right) = n - p$.