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| Assessment 4Dusty Wilson Math 220 No work = no credit | **Name**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  *May not music be described as the mathematics of the sense, mathematics as music of the reason? The musician feels mathematics, the mathematician thinks music: music the dream, mathematics the working life.*  James Joseph Sylvester 1814 - 1897 (English mathematician) |

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| Warm-ups (1 pt each):  Note: Assume | =\_\_\_\_\_ | =\_\_\_\_\_ | =\_\_\_\_\_ |

(1 pt) The quote above is by Sylvester who was one of the inventers of linear algebra. What connection did Sylvester draw between math and music? Answer using complete English sentences.

(3 pts) A linear transformation *T* from a vector space *V* into a vector space *W* is a rule that assigns to each vector  in *V* a unique vector  in *W*, such that

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The null space a linear transformation is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(2 pts) Define a linear transformation  by . Find polynomials  and  in  that span the kernel of *T*.

(5 pts) Find a spanning set for the null space of the matrix 

(5 pts) Given  and  in a vector space *V*, let .

1. What properties must *H* satisfy if it is to be a subspace?

1. Show that *H* is a subspace of *V*.