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| Assessment 6 (10 or 11 am)Dusty Wilson Math 220No work = no credit | **Name (first & last)**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*Either mathematics is too big for the human mind or the human mind is more than a machine.* Kurt Gödel 1906-1978 (Austrian mathematician) |

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| Warm-ups (1 pt each): | = | = |  = |

(1 pt) Based upon the quote by Gödel (above), did Gödel believe that all mathematics could be performed by a machine? Please answer using complete sentences.

(4 pts) Show that is a basis for  and then find the coordinate vector of  relative to .

(8 pts) Given the matrix , answer the following.

1. Find a basis for the column space of *A*.
2. Find 
3. What is the dimension of the null space of *A* and what is the rank of *A*?

1. The zero vector is in both the null space and column space. List all vectors (if any) in the intersection (overlap) of the two subspaces.

(4 pts) Complete the proof of the Unique Representation Theorem

Claim: Let be a basis for a vector space *V*. Then for each  in *V*, there exists a unique set of scalars  such that .

Proof.

(3 pts) True or False (circle one). Justify your answer.

1. (T or F) If , then  is a basis for *H*?

1. (T or F) The dimension of the vector space  is 4.

1. (T or F) The dimensions of the row space and the column space of *A* are the same, even if *A* is not square.