Presentation project

Sometime in November, you will have to do a presentation of a "proof in a vector space setting". I will allow you to meet this requirement in one of two possible ways: either come to my office and do the proof OR create a video wherein you do the proof. All proofs will be graded with the "presentation rubric" attached to the e-mail. Your presentation will be worth ***four*** quiz grades (i.e. 20 points) and may earn you up to 5 bonus points in the course, depending on how well you do on the presentation rubric.

In either way you do it, I want to see every relevant definition defined at the beginning as part of the presentation (before the proof). You do not need to define "vector space", but all other mathematical terms should be defined.

Non-video instructions: Study the proofs below. When you are ready to come to my office to do your proof, I will pick a random integer between 1 and 5 and you will prove it on the whiteboard. We will take pictures of your proof at the end (with your name appearing somewhere) and you will upload them to Taskstream.

Video instructions: Study the proofs below. When you are ready to make your video, I will pick a random integer between 1 and 5 and you will create a video proving it. Once you are assigned a number, you must complete your video ***within 24 hours*** and either e-mail it to me or put it on Youtube (or similar site) and e-mail me a link (putting on a thumbdrive is ok, but you need to stick to the 24 hour timespan for me to receive it). You ***must speak*** in the video to describe what is happening (the assessment language mentions that you must "communicate orally"). You ***cannot*** print your proof off and merely read it – you must be writing it. Your video must be uploaded to Taskstream.

Possible proofs All of these theorems appear in Chapter 6. You are welcome to e-mail me questions about them, but I will not write full proofs for you (many (all?) are included in the text).

Theorem 1: Let V be a vector space and let $\{\vec{v}_1, \ldots, \vec{v}_n\}$ be a set of vectors in V. Then $\text{span}\Big(\{\vec{v}_1, \ldots, \vec{v}_n\}\Big)$ is a subspace of V.

Theorem 2: Let $\mathscr{B} = \{\vec{v}_1, \vec{v}_2, \ldots, \vec{v}_n\}$ be a basis for a vector space V. Let $\vec{u}_1, \vec{u}_2 \in V$ be vectors and let $\alpha \in \mathbb{R}$ be a scalar. Then,

$$[\vec{u}_1 + \vec{u}_2]_{\mathscr{B}} = [\vec{u}_1]_{\mathscr{B}} + [\vec{u}_2]_{\mathscr{B}},$$

and

$$[\alpha\vec{u}_1]_{\mathscr{B}} = \alpha\,[\vec{u}_1]_{\mathscr{B}}.$$

Theorem 3: Let V and W be vector spaces and let $T\colon V \to W$ be a linear transformation. Then $\ker(T)$ is a subspace of V.

Theorem 4: Let V, U, and W be vector spaces and let $T_1\colon V \to U$ and $T_2\colon U \to W$ be linear transformations. Then $S \circ T\colon V \to W$ is a linear transformation.

Theorem 5: Let V and W be vector spaces. A linear transformation $T\colon V \to W$ is one-to-one if and only if $\ker(T) = \Big\{\vec{0}_V\Big\}$.

Math Presentation Rubric 19-20

	0	1	2	3	4	Score/Level
Organization	The presentation has no organization.	Audience cannot understand presentation because there is no sequence of information.	Audience has difficulty following presentation because student jumps around.	The information is presented in logical sequence which audience can follow.	The information is presented in logical, interesting sequence which audience can follow.	
Content Knowledge	The student shows no understanding of mathematical concepts within the presentation.	The student shows little understanding of mathematical concepts within the presentation.	The student is visibly uncomfortable with the mathematical concepts of the presentation.	The student is at ease with the mathematical concepts of the presentation but lacks a deep conceptual understanding.	The student demonstrates a complete and comprehensive understanding of the mathematical concepts in the presentation.	
Visuals	The student uses no visuals.	The student uses few visuals and they are not appropriate to the material.	The student occasionally uses visuals that rarely support the presentation and audience understanding.	The visuals used are related to the presentation but do not completely support audience understanding.	The visuals used supports audience understanding.	
Mechanics	The presentation contains more than four spelling, grammatical or mathematical errors.	The presentation contains four spelling, grammatical or mathematical errors.	The presentation has three spelling, grammatical or mathematical errors.	The presentation has no more than two spelling, grammatical or mathematical errors.	The presentation has no spelling, grammatical or mathematical errors.	
Delivery	The student mumbles, incorrectly pronounces terms, and speaks too quietly for students in the back of class to hear.	The student mumbles, incorrectly pronounces terms, or speaks too quietly for students in the back of class to hear.	The student incorrectly pronounces terms. Audience members have difficulty hearing presentation.	The student's voice is clear. Student pronounces most words correctly	The student uses a clear voice and correct, precise pronunciation of terms.	