

**Linear Algebra**  
**MATH 224W – Spring 2016**

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Week 11: Dimension and Isomorphisms

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**Writing Assignment #10**

**due ~~Monday, Apr. 11~~ Tuesday, Apr. 12**

§4.6 #40, 47

For #40, it might be helpful to argue by contradiction and use the Trimming Down Theorem (Theorem 4.9). Please **do not** use Corollary 4.3 in your proof of #40 since it is similar, and we did not prove it.

AP #1 Let  $V$  be a finite dimensional vector space, and let  $W$  be a subspace of  $V$ . Prove that  $\dim W \leq \dim V$ . *Note: when proving this, you can use the extra credit problem below even if you don't prove it; it will probably be useful. Consider using the Building Up Theorem (Theorem 4.11).*

AP #2 Let  $V$  be a finite dimensional vector space, and let  $W$  be a subspace of  $V$ . Prove that if  $\dim W = \dim V$ , then  $W = V$ . *Hint: by definition of a subspace, you know that  $W \subseteq V$ , so you "just" need to show that  $V \subseteq W$ , i.e. that every element of  $V$  is in  $W$ .*

Extra Credit Let  $V$  be a finite dimensional vector space, and let  $W$  be a subspace of  $V$ . Prove that  $W$  is finite dimensional.

**Homework #10**

**due Thursday, Apr. 14**

§4.8 #2, 4, 8, 12, 15(a,b,c,e), 17(a,b,c), 23

§4.7 #10, 12

Remember that you can use a computer (<http://www.wolframalpha.com> is one option) to perform your row reduction as long as you clearly state what you have done.