MATH 234
MAKE YOUR OWN TEST 1 REVIEW

Step 1: Insert appropriate points or equations into the following questions.

1. Perform the following vector operations for $\mathbf{u} = $ ___, $\mathbf{v} = $ ___, and $\mathbf{w} = $ ___.
   a. $2\mathbf{u} + 3\mathbf{v}$
   b. $|\mathbf{u} + \mathbf{w}|$
   c. $\mathbf{u} \cdot \mathbf{v}$
   d. $\mathbf{u} \times \mathbf{v} + 3\mathbf{w}$

2. Find the angle between the vectors ___ and ___.

3. Calculate the vector projection $Proj_{\mathbf{v}}\mathbf{u}$. (This is likely to appear as word problem or in other problems too)

4. Write the vector ___ in (magnitude)(unit vector) form.

5. A force of ___ is applied to a wrench at an angle of ___ at distance ___ from the bolt. Find the magnitude of the torque. What is the relationship between the direction of the torque and the force?

6. Find the area of the triangle (or parallelogram) with vertices ___, ___, and ___ (and ___ for parallelogram).

7. Write an equation for a line which passes through the two points ___ and ___.

8. Write an equation for the plane containing the three points ___, ___, and ___.

9. Write an equation for the plane parallel to the plane ___ and containing the point ___.

10. Write a parameterization for the line given by the intersection of the two planes ___ and ___.

11. Write an equation for the plane spanned by the two intersecting lines ___ and ___.

12. Find the distance between the point ___ and the line ___.

13. Show the following line and plane are parallel and then find the distance between them.

14. Sketch a graph of the (quadric or cylindrical) surface given by the following equation: ___.

15. Below are ___ equations and ___ graphs. For each equation, identify the correct graph.

Step 2: Insert real-world things into two of the above questions to make them word problems. For example, calculating $|\mathbf{u}+\mathbf{v}|$ could be made a word problem by saying that a bird flew in a straight line in some direction (giving $\mathbf{u}$) and then in another line (giving $\mathbf{v}$). How far is the bird from where he started from? Another example is to use vector projections in problems involving force in some direction not parallel to displacement.