TEST PREP on 12.4 and 12.5- Dr. Loveless

Test Prep Reminder: These problems mostly come *directly* from the Dr. Loveless old exam archive. You can find solutions in that archive after class. Keep asking yourself, could I really do this on a test? How can I be more efficient? And how can I check my answers?

Remember after you do the first problem (first 5-10 minutes of class), then feel free to ask homework questions and/or continue to the next page. Make these quiz sections your own and work with your TA. Ask your TA questions, tell your TA what you need help with, have a vote on what to do as a class, work together!

12.5 Extra Help:

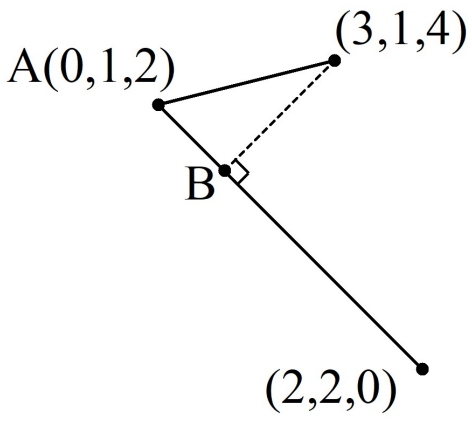
- Based on student questions over the years, I have created some materials to provide extra help on 12.5 lines and planes. This is an important section: it will be a big part of exam 1 and lines/planes are key tools for the rest of the term.
  - Review sheet of main line/plane concepts - also includes additional examples on the intersection of two lines and intersection of two planes.
  - Visuals/Derivations for Lines/Planes - know these visuals well.
  - Flowchart on how to approach finding equations for Lines/Planes
  - Practice sheet of finding lines/planes with solutions.

PARTICIPATION CODE: Don't forget to ask your TA for the participation code! Enter this on Canvas before the end of quiz section!

Spring 2018 - Exam 1 - Dr. Loveless (part (a) involves cross-products, part (b) is more dot products).

1(a). Find a vector that has length 7 and is orthogonal to both $\mathbf{u} = \langle 1, 0, 2 \rangle$ and $\mathbf{v} = \langle 3, -2, 1 \rangle$

1(b). Find the distance from point A to point B in the picture below (Hint: Use vector tools!)



Winter 2018 - Exam 1 - Taggart (*on vector operations, you have some HW questions like this*)

1. In this problem $\mathbf{u}$, $\mathbf{v}$, and $\mathbf{w}$ are non-zero vectors in three-dimensions. Indicate whether each of the following expressions is a scalar (**S**), a vector (**V**), or nonsense (**N**).

expression	(circle one)
$\mathbf{u} \cdot (\mathbf{v} \times \mathbf{w})$	**S** **V** **N**
$(\mathbf{u} \cdot \mathbf{v}) \times \mathbf{w}$	**S** **V** **N**
$\dfrac{\mathbf{u} \cdot \mathbf{v}}{\lvert\mathbf{w}\rvert}$	**S** **V** **N**
$\left(\dfrac{\mathbf{u} \cdot \mathbf{v}}{\lvert\mathbf{w}\rvert}\right) \mathbf{w}$	**S** **V** **N**
$\text{comp}_{\mathbf{w}} (\mathbf{u} - \mathbf{v})$	**S** **V** **N**
$\dfrac{1}{\lvert\mathbf{u}\rvert} \mathbf{proj}_{\mathbf{w}} (\mathbf{v})$	**S** **V** **N**

Spring 2013 - Exam 1 - Dr. Loveless (*finding plane and line equations which is from 12.5, you may not be ready for this yet, but come back to this as you do the 12.5 HW*)

1(a). Consider the line through the points $P(1, 3, -2)$ and $Q(3, 5, 7)$. Find the (x, y, z) coordinates of the point at which this line intersects the xz-plane.

1(b). Consider the **plane**, P, that contains the point $(1, -1, 2)$ and is the orthogonal to the line given by

$$L : \begin{cases} x = -3t \\ y = 2 + 7t \\ z = 5 - t \end{cases}$$

(a) Find the equation for the plane, P.

(b) At what point (x, y, z) does this plane intersect the x-axis?