TEST PREP on Chapter 12- Dr. Loveless

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

Let's put everything together. The following contains the first two pages of the spring 2023 exam 1. Spend 5-10 minutes reading these two pages. Think about how you would react if you saw similar problem. After 5-10 minutes, ask your TA about one or two of the questions (as a group), then switch over to working on the 12.6, 13.1 and 13.2 homework.

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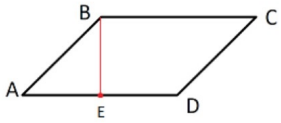
1. (12 pts)

   (a) (3 pts) Consider $x^2 - 4y^2 - z = -9$.

   - Give the 2D name of the traces when $x = k$ is fixed. Name: _____
   - Give the precise name of the 3D shape given by $x^2 - 4y^2 - z = -9$

   Name: _____

   (b) Consider the parallelogram shown with $A(1, 1, 2)$, $B(2, 3, 7)$, $C(5, 3, 11)$, $D(4, 1, 6)$.



   i. (4 pts) Find the area of the parallelogram ABCD.

   Area = _____

   ii. (3 pts) Find the vector of length 5 that points in the same direction as $\overrightarrow{BD}$.

   Vector: _____

   iii. (2 pts) The line segment BE (shown) is perpendicular to the segment AD. Find the length of the segment AE.

   Length $= |AE| =$ _____

2. (14 pts)

(a) (2 pts) True or false, circle one for each statement:

- TRUE or FALSE : Two planes are always parallel or intersecting.
- TRUE or FALSE : Two planes perpendicular to a given plane must be parallel.

(b) (6 pts) Consider the line that contains the point $(5, 0, 0)$ and is orthogonal to the plane $3y - 4z = 10$. Find the two points of intersection of this line with the paraboloid $20x = y^2 + z^2$. (First find parametric equations for the line!)

Intersection Points: $(x, y, z) =$ _____

(c) (6 pts) Find an equation for the plane that passes through the point $(0, 0, 2)$ and contains the line of intersection of the planes $x + y - z = 1$ and $2x + y - 3z = -1$. And give the x-intercept of this new plane equation.

Plane Equation: _____

x-intercept: $(x, y, z) =$ _____