

Reminders

- Your Quiz 2 is due Thursday night (**01/25/2023**) by 9PM. Don't wait until the last minute!
- Show all your work for the weekly reviews! Grading is based completion and method, not just the final answer.
- Selected answers are provided on the last page. To discuss solutions for other problems, see your TA, visit office hours, or visit the MLC.
- Turn this document to your instructors for in-person sections. Scan and upload this document by 11:59PM Thursday night (**01/25/2023**) to receive credit for online sections.

Example 1. What should a be so that \mathbf{r}_1 and \mathbf{r}_2 are perpendicular?

$$\begin{aligned}\mathbf{r}_1(t) &= \langle t - 1, 3t + 2, -t + 5 \rangle & -\infty < t < \infty \\ \mathbf{r}_2(s) &= \langle 2s, 6s + 5, -2as + 1 \rangle & -\infty < s < \infty\end{aligned}$$

Example 2.

- (a) Suppose $\mathbf{u} = \langle 1, 1, 1 \rangle$ and $\mathbf{v} = \langle 2, 1, 5 \rangle$. Find $\mathbf{w} = \mathbf{u} \times \mathbf{v}$. Write an equation for a plane containing the point $(1, 2, 3)$ and whose normal vector is \mathbf{w} . Let (a, b, c) be the **unit** normal vector of this plane, what is $a + b + c$?
- (b) Find an equation of the plane through the line of intersection of the planes $x - z = 1$ and $y + 2z = 3$ and perpendicular to the plane $x + y - 2z = 1$. Let (a, b, c) be the **unit** normal vector of this plane, what is $|a| + |b| + |c|$?

Example 3. Classify the surface $4x^2 - y^2 + 2z^2 - 9 = 0$ (remember grading is based on method. show your work!)

Example 4.

- (a) Find an equation of the plane \mathcal{P}_1 that passes through the points $A(2, 1, 1)$, $B(-1, -1, 0)$, and $C(1, 3, -4)$.
- (b) Find an equation of the plane \mathcal{P}_2 that passes through the points $D(2, 0, 4)$ and has normal vector $(2, -4, -3)$.
- (c) Find the angle between the two planes.
- (d) Find parametric equations for the line of intersection of the two planes.

Example 5.

- (a) Find the distance d_1 from the origin to the line $\mathbf{r}(t) = (1 + t, 2 - t, -1 + 2t)$.
- (b) Find the distance d_2 between the planes $3x + y - 4z = 2$ and $3x + y - 4z = 24$.

What is $d_1 + d_2$?

Selected Final Answers: (rounded to 3 decimal places as on D2L quizzes)

Ex1: -10 Ex2: 0, 1.732
