Ursinus CS 476 Background Knowledge Assessment

Fill out the answers to the questions below to the best of your ability. If you do not know how to approach a particular question, please skip and do not guess. *This is completely anonymous and ungraded!*

1. What is the unit normal of the triangle with vertices $(-1, 0, 0)$, $(1, 0, 0)$, $(0, 1, 0)$?

2. Circle the letters corresponding to pairs of vectors which are perpendicular

   a. $(1, 1, 0)$ and $(0, 0, 1)$
   b. $(-1, 1, 0)$ and $(1, -1, 0)$
   c. $(-2, 1, 0)$ and $(1, 2, 0)$
   d. $(1, 2, 1)$ and $(-3, 1, 1)$

3. What is parallel projection of the vector $(1, 1, 3)$ onto the vector $(1, 1, 1)$?

4. Fill in the blank: $\pi/3$ radians is _____ degrees

5. Complete the following matrix multiplication: $\begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} =$

6. By what angle θ does the matrix $R_\theta = \sqrt{2}/2 \begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}$ rotate a vector? _____ radians

7. What is the unit normal of the plane described by the equation $Ax + By + Cz + D = 0$?

8. What is the gradient of the function $f(x, y, z) = e^{-x^2 + y^2 + z^2}$?

9. Circle one of the items below that best approximates your plans for the class

   a. I am enrolled in the class and plan to stay
   b. I am enrolled in the class but I may drop
   c. I am not enrolled in the class but would like to enroll. (Are you on the waitlist? YES/NO)
   d. I am not enrolled in the class and do not plan to enroll