MULTIVARIABLE CALCULUS MATH 2D

(Sample) Midterm Exam I

Problem 1.

Find the distance between spheres

$$x^2 + y^2 + z^2 = 4$$

and

$$x^2 + y^2 + z^2 + 2x + 4y + 6z - 86 = 0$$

Problem 2.

Find the dot product and the cross product of vectors $\bar{v}$ and $\bar{u}$ if

a) $\bar{v} =< 1, 1, 1 >$ and $\bar{u} =< 3, 3, 3 >$

b) $\bar{v} =< 1, 2, 3 >$ and $\bar{u} =< 3, 2, 1 >$

c) $\bar{v} =< 1, 0, -1 >$ and $\bar{u} =< 4, 0, 4 >$

Problem 3.

Verify that the plane that contains points $(1, -1, 1)$, $(2, 0, -1)$, $(0, 0, 1)$ is parallel to the plane that contains points $(5, 0, 0)$, $(0, 5, 0)$, $(1, 2, 2)$, and find the distance between these planes.

Problem 4.

Find the distance between the skew lines with parametric equations

$$x = t,\ y = t,\ z = t$$

and

$$x = 2t + 1,\ y = 2t + 3, z = -t$$

Problem 5.

Find the equation of the surface obtained by rotating the parabola $y = x^2$ about the y-axis. Identify the surface.