

Math 223 Exam#1

Name _____

I.D. # _____

1. (15 pts) Find the distance from $(1, -2, 3)$

(a) to xz -plane.

(b) to x -axis.

(c) to the point $(5, -4, -3)$.

2. (6 pts) Describe the set of the points whose distance from the y -axis equals the distance from the point $(-1, 2, -3)$.

3. (8 pts) Sketch the contour diagram of the function $f(x, y) = x + 2y^2$ with at least *four* labeled contour curves.

4. Given vectors $\vec{v} = \vec{i} - \vec{j} - 2\vec{k}$ and $\vec{w} = \vec{j} + 3\vec{k}$,

(a) (4 pts) Find $4\vec{v} - 3\vec{w}$

(b) (5 pts) Find $\|\vec{v}\|$

(c) (4 pts) Find a unit vector in \vec{v} direction

(d) (4 pts) Find a vector with length 3 in \vec{v} direction

(e) (8 pts) Find $\vec{v} \cdot \vec{w}$

(f) (8 pts) Find $\vec{v} \times \vec{w}$

(g) (4 pts) Are \vec{v} and \vec{w} perpendicular, parallel, or neither?

(h) (4 pts) Are \vec{v} and $\vec{v} \times \vec{w}$ perpendicular, parallel, or neither?

5. (30 pts) Find an equation for each of the following planes

(a) The plane which passes through the point $P_1(1, -2, -3)$ and has slope in x -direction $m = -1$ has slope in y -direction $n = 2$.

(b) The plane which passes through the points $A(3, 0, -1)$, $B(0, 1, -1)$ and $C(2, -1, 1)$.

(c) The plane passing through $(3, 0, -1)$ and parallel to the the plane $x - 2y = 3z - 4$.