Math 17C
Kouba
Discussion Sheet 1

1.) Graph each of the following equations in two-dimensional space.

a.) $y = 3$ b.) $x = -2$ c.) $y = x$ d.) $y = 3 - x$ e.) $y = x^3$

f.) $y = e^x$ g.) $y = \ln x$ h.) $y = \sqrt{x}$ i.) $x = y^2$ j.) $y = \dfrac{1}{x}$

2.) Sketch the level curves for each of the following equations (surfaces) using the following values of z : -3, -2, -1, 0, 1, 2, 3

a.) $z = y$ b.) $z = 1 - x - y$ c.) $z^2 = x^2 + y^2$ d.) $x^2 + y^2 + z^2 = 9$

3.) Sketch all three coordinate plane traces (i.e., $x = 0$, $y = 0$, and $z = 0$) for each of the following equations (surfaces).

a.) $x + 2y + 3z = 6$ b.) $z = x^2 + y^2$ c.) $z = y^2 - x^2$ d.) $z^2 = x^2 + y^2$

4.) Sketch in three-dimensional space each of the following equations (surfaces). Use intercepts, traces, and/or level curves as necessary.

a.) $y = 3$ b.) $x = -2$ c.) $y = x$ d.) $y = 3 - x$ e.) $y = x^3$

f.) $y = e^x$ g.) $y = \ln x$ h.) $y = \sqrt{x}$ i.) $x = y^2$ j.) $y = \dfrac{1}{x}$

k.) $x^2 + y^2 + z^2 = 4$ l.) $x + 2y + 3z = 6$ m.) $z = x^2 + y^2$ n.) $z^2 = x^2 + y^2$

o.) $z^2 = x^2 + y^2 - 1$ p.) $z^2 = x^2 + y^2 + 1$ q.) $z = y^2 - x^2$

5.) Determine the center and radius of each of the following spheres..

a.) $x^2 + y^2 + z^2 = 144$ b.) $x^2 + y^2 + z^2 = 6y$

c.) $x^2 + 2x + y^2 - 4y + z^2 + 6z = 11$

d.) sphere whose diameter has endpoints $(-1, 1, 3)$ and $(1, 4, -3)$

6.) Sketch the domain of each function.

a.) $f(x, y) = \ln(x^2 + y^2 - 4)$ b.) $f(x, y) = \ln(1 + x + y)$

c.) $f(x, y) = \dfrac{1}{4 - \sqrt{25 - x^2 - y^2}}$ d.) $f(x, y) = \sqrt{(x^2 - 4)(y^2 - 1)}$
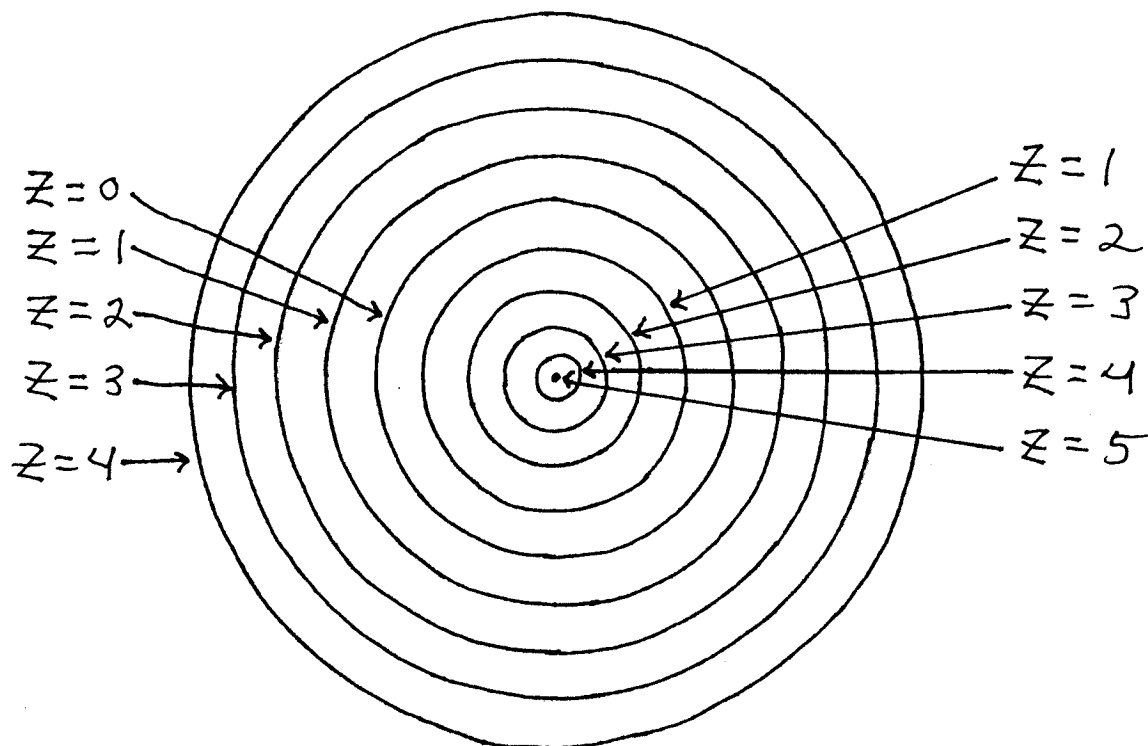
7.) Determine the domain and range of each function.

a.) $f(x, y) = \sqrt{4 - x^2 - y^2}$ b.) $f(x, y) = 3 + e^{x^2 + y^2}$

c.) $f(x, y) = 4 - x^2 - y^2$ d.) $f(x, y) = x + y + 1$

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8.) Let $f(x, y) = \ln(9 - x^2 - y^2)$.

    a.) Determine and sketch the domain of f.
    b.) Determine the range of f.
    c.) Sketch the graph of f.

9.) Sketch a surface corresponding to the following level curves.

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"I intend to live forever. So far, so good." – Steven Wright