Math 21C
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.) Determine the center and radius of each of the following spheres.

a.) $x^2 + y^2 + z^2 = 16$ b.) $x^2 + y^2 + z^2 = 16x$

c.) $x^2 + (y-3)^2 + (z+7)^2 = 4/9$ d.) $2x^2 - 4x + 2y^2 + 4y + 2z^2 - 12z = 28$

e.) $(x-1)^2 + 2y^2 + (z-3)^2 = (y+1)^2$

3.) A diameter of a sphere has endpoints $(0, 1, -1)$ and $(4, -3, 1/2)$. Determine an equation of this sphere.

4.) A rectangular box of length A, width B, and height C is inscribed in the sphere $x^2 + y^2 + z^2 = 1$. Show that $A^2 + B^2 + C^2 = 4$.

5.) 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.) $x^2 + y^2 + z^2 = 9$

6.) 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.) $z^2 = x^2 + y^2$

7.) Sketch in three-dimensional space each of the following equations (surfaces). Use traces and/or level curves if 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.) $z = y^2 - x^2$

THE FOLLOWING PROBLEM IS FOR RECREATIONAL PURPOSES ONLY.

8.) A circus is witnessed by 120 people who have paid a total of \$120. The women paid \$5 each, the men paid \$2 each, and the children paid 10 cents each. How many women and children went to the circus ?