MTH 265, Quiz #2, Summer 2021 Name KEY

Instructions: Show all work. Use exact answers unless specifically asked to round. Be sure to complete all parts of each question.

1. Find the equation of the plane that contains the line $\frac{x-3}{4} = \frac{y+2}{2} = z$ and the point, (2,2,7). [Hint: find a point on the line and the vector between that point and the given point to obtain a second vector in the plane.]

$\langle 4, 2, 1 \rangle$

$(3, -2, 0)$
$(2, 2, 7)$
$\langle 1, -4, -7 \rangle$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 4 & 2 & 1 \\ 1 & -4 & -7 \end{vmatrix} = (-14+4)\hat{i} - (-28-1)\hat{j} + (-16-2)\hat{k}$$

$$-10\hat{i} + 29\hat{j} - 18\hat{k} = \langle -10, 29, -18 \rangle$$

$$-10(x-2) + 29(y-2) - 18(z-7) = 0$$

2. Describe or sketch the graphs of the surfaces given by the equations below.

a. $x^2 + y^2 = z^2$

Cone, wrapped around z-axis

b. $y = \sin z$

extend as a sheet in x-direction

c. $x^2 + y^2 + z^2 + 6x - 4y + 8z - 35 = 0$

Sphere

$$(x^2+6x+9) + (y^2-4y+4) + (z^2+8z+16) = 35+9+4+16$$

$$(x+3)^2 + (y-2)^2 + (z+4)^2 = 64$$

centered at $(-3, 2, -4)$ w/ radius 8