Analysis H – Deggeller/Hahn/Gleason
3 Quiz 2 – 3D graphing
NO CALCULATORS

Timothy H is back in the saddle.
Period: G

31/31

1. Identify each of the quadric surfaces by name. [1 pt each]

a) $4x^2 - z^2 = y - 2$ $y = 4x^2 - z^2 + 2$ a) hyperbolic paraboloid (saddle)

b) $3x^2 + 4y^2 - 2y + 3z^2 = 8$ $3x^2 + 4(y-\frac{1}{4})^2 + 3z^2 = C$ b) ellipsoid

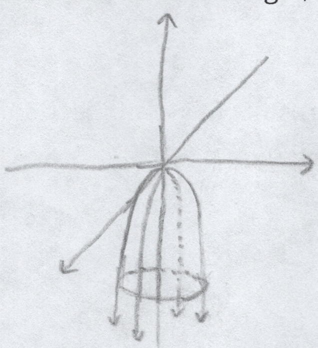
c) $z^2 + z - 2 = 3y$ $y = \frac{z^2+z-2}{3}$ c) parabolic cylinder

d) $5x^2 + 2y^2 - 3z^2 = -4$ d) hyperboloid of two sheets

$3z^2 - 4 = 5x^2 + 2y^2$

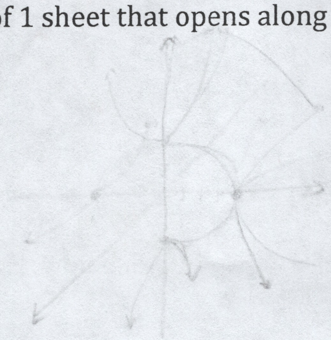
2. For each of the following figures, (1) make a sketch, and (2), write an equation.

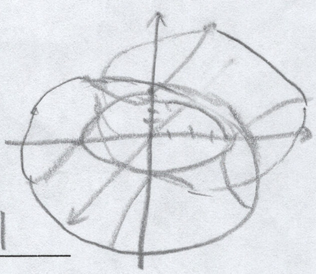
a) A elliptical paraboloid that hits the origin, opens along the negative z-axis. [3 pts]



equation: $-z = x^2 + y^2$

b) A hyperboloid of 1 sheet that opens along the x-axis and goes through the points (0, 4, 0) and (0, 0, 3). [3 pts

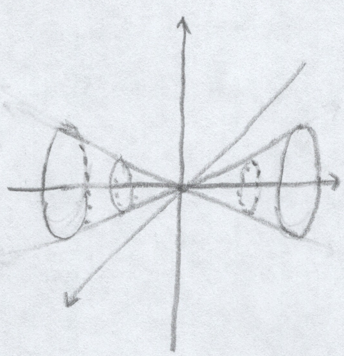




equation: $x^2 = \frac{y^2}{16} + \frac{z^2}{9} - 1$

$x^2 = \frac{y^2}{4^2} + \frac{z^2}{3^2} - 1$

c) An elliptic cone that opens along the y-axis. [3 pts]



equation: $y^2 = x^2 + z^2$

-0

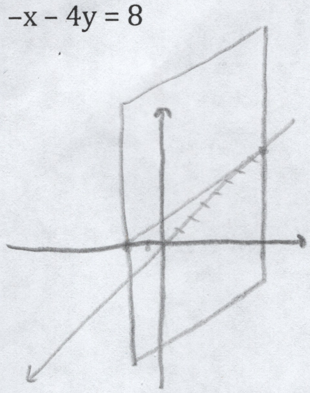
3. Sketch each of the following 3D surfaces. Then identify it by its correct name. There is no need to label specific points on your graph, but it should be accurate as far as orientation, and relation to the origin. [4 each]

$\frac{(z-2)^2}{2} = 4$

$(z-2)^2 = 8$

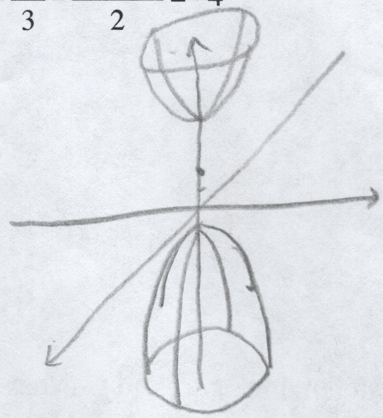
$z = \pm 2\sqrt{2}$

a) $-x - 4y = 8$



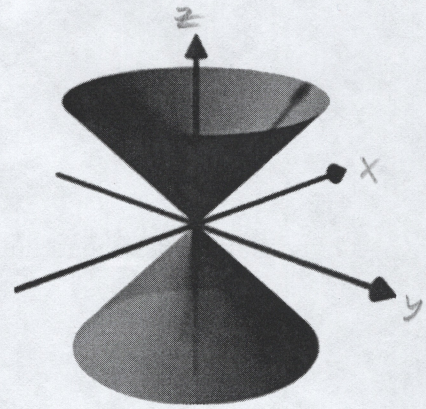
name: plane

b) $\frac{x^2}{3} + \frac{y^2}{3} - \frac{(z-2)^2}{2} = -4$



name: hyperboloid of two sheets

4. The **intersection** of the shown quadric and some plane results in a conic section. Find a possible equation of the plane for the given conic section.
[1 pt each]

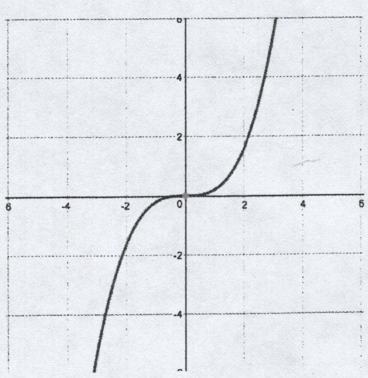


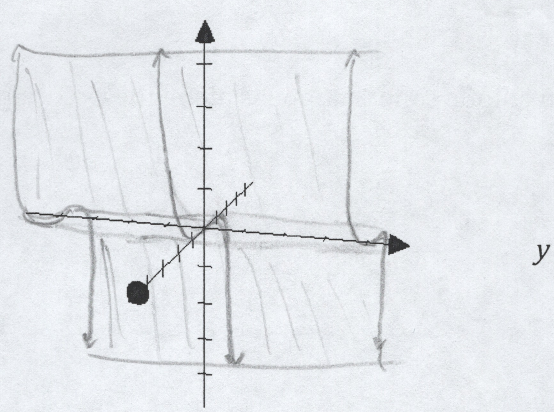
a) hyperbola: $y = 2$

b) circle: $z = 1$

c) parabola: $y + z = 1$ (assuming the slope of the cone is 1)

7. Below is the graph of $y = \frac{1}{5}x^3$ in 2-d. Sketch the graph of $z = \frac{1}{5}x^3$ in 3-d, below. [3 pts]





/-0