SI Session: February 9th, 10th & 11th, 2009
Mondays: 4:50 PM – 6:20 PM
Tuesdays: 1:30 PM – 3:00 PM
Wednesdays: 4:50 PM – 6:20 PM
Room 1245 SNAD

Prof. Stockton : Calculus III
Spring 2009
SI Leader : Neil Jody

[1] Find an equation of the plane that contains the following lines:

$l_1 : x = t, y = 2 - t, z = 2 + 3t$ and $l_2 : x = 1 + 4t, y = 1, z = 5 + 2t$

[2] Find the distance from the point (1,2,3) to the plane $x + y - 2z = 1$.

[3] Find an equation of the plane containing the points $(2,1,1),(-3,1,-2),(4,-5,-1)$.

[4] The planes $2x+3y-z=2$ and $x-y+3z=-1$ intersect in a line.
Find parametric equations for this line.

[5] Find an equation of the plane containing the point $(-1,1,4)$ and orthogonal to the line given by $x=1+2t, y=3-t, z=8+3t$.

[6] Find an equation of the plane which contains the points $(1,1,-3)$ and $(2,-1,-2)$ and is perpendicular to the plane given by $2x-3y-z=6$.

[7] Find the distance between the point (1,2,3) and the line with parametric equations $x=1+t, y=1-t, z=2t$.

[8] Match each equation with the surface it describes.

______ $x^2 = 2y^2 + 2z^2$

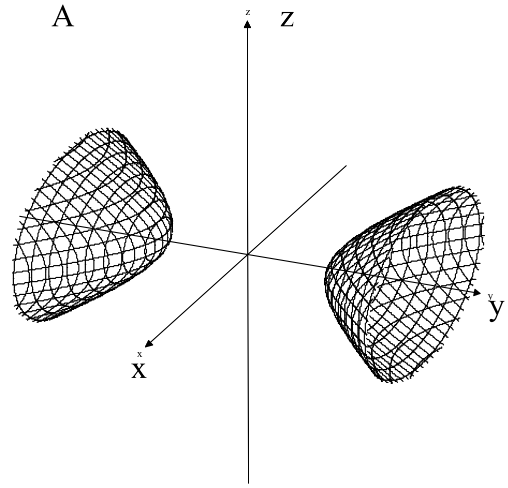
______ $5x^2 - 4y^2 + 15z^2 = -4$

______ $z = x^2 + 4y^2$

______ $3z = x^2 - y^2$

______ $y^2 - x^2 + z^2 = 1$

A



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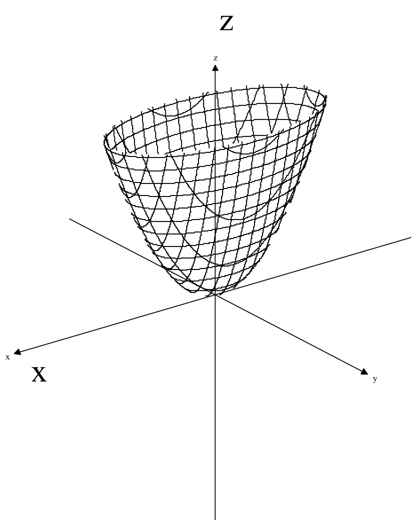

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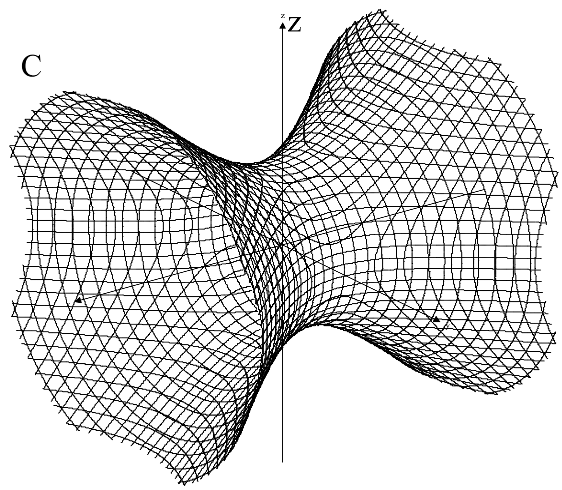

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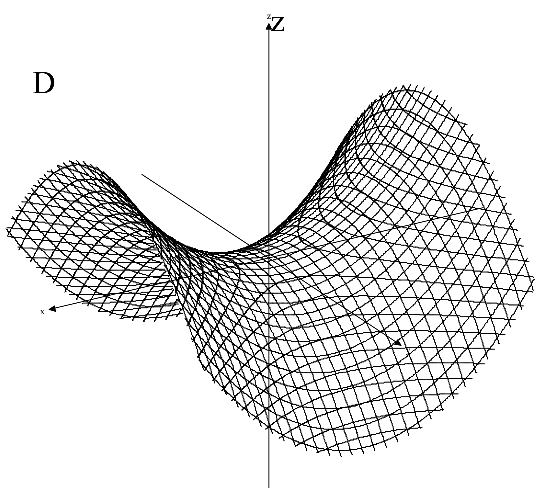

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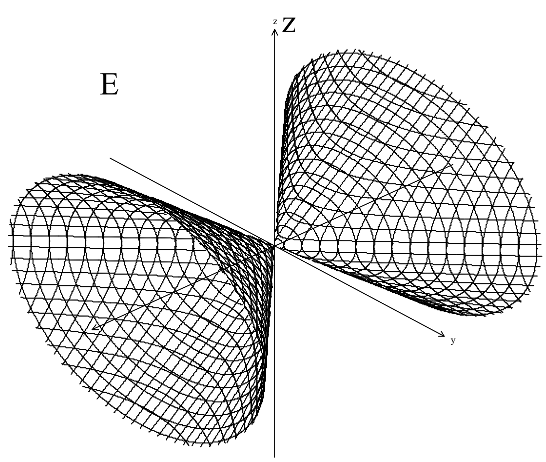

[9] Represent the plane curve by a vector-valued function. (There are many correct answers.)

(a) $2x - 3y + 5 = 0$

(b) $y = 4 - x^2$

(c) $(x-2)^2 + y^2 = 4$

(d) $\frac{x^2}{16} - \frac{y^2}{9} = 1$

[10] Evaluate the limit.

(a) $\lim_{t\to+\infty}\left\langle \frac{t^2+1}{3t^2+2}, \frac{1}{t} \right\rangle$

(b) $\lim_{t\to 0}\left(e^t\hat{i} + \frac{\sin t}{t}\hat{j} + e^{-t}\hat{k} \right)$

(c) $\lim_{t\to 1}\left(\sqrt{t}\hat{i} + \frac{\ln t}{t^2-1}\hat{j} + 2t^2\hat{k} \right)$

(d) $\lim_{t\to+\infty}\left(e^{-t}\hat{i} + \frac{1}{t}\hat{j} + \frac{t}{t^2+1}\hat{k} \right)$

[11] A particle travels along the curve given by $\vec{r}(t) = (2\cos t, 2\sin t, t)$ where $0 \le t \le 2\pi$.

(a) Find the length of the curve traced by the particle.

(b) Find parametric equations for the line tangent to the curve at the point $(-2, 0, \pi)$.

(c) At what time will the particle be exactly 7 units from the origin?

(d) Show that the velocity and acceleration of the particle are always orthogonal.

(e) At what time will the particle intersect the surface $z + 1 = x^2 + y^2$?