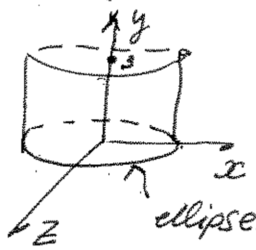
Svar till Tenta 2013-01-17.

1. (a)



ellipsen $\frac{x^2}{4}+z^2=1$

(b) —

2. (a) $\nabla f(\pi/2, 1) = (1, \frac{\pi}{2})$

(b) $f'_{\mathbf{v}}(\pi/2, 1) = \nabla f(\pi/2, 1) \cdot \frac{\mathbf{v}}{\|\mathbf{v}\|} = -\frac{3}{5} + \frac{2\pi}{5}$

(c) $z = x + \frac{\pi}{2}(y-1)$

3 (a) $\frac{e-1}{2}$ (b) 12π

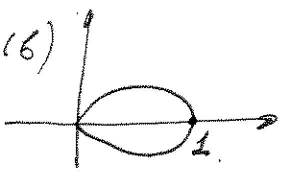
4. $\text{Min} = -\frac{1}{4}$, $\text{Max} = 2+\frac{1}{4}$

5. Egenvektorer till $\lambda = 2$: $\mathbf{v} = s\begin{bmatrix}1\\1\\0\\0\end{bmatrix} + t\begin{bmatrix}1\\0\\1\\0\end{bmatrix} + r\begin{bmatrix}1\\0\\0\\1\end{bmatrix}$, $(s,t,r) \neq (0,0,0)$

$\lambda = -2$: $\mathbf{v} = t\begin{bmatrix}-1\\+1\\+1\\1\end{bmatrix}$

$\text{proj}_{\text{Egenrummet till } \lambda=-2}\begin{bmatrix}1\\1\\1\\1\end{bmatrix} = \begin{bmatrix}-1\\1\\1\\1\end{bmatrix}$

6. (b)



(c) Arean $= \frac{8}{15}$

7. Största värdet av $f(x,y) = x^3+3x+y^3+3y$ under bivillkoret $2x^2+2y^2=1$ är $f(\frac{1}{2}, \frac{1}{2}) = \frac{13}{4}$

Minsta — $f(-\frac{1}{2}, -\frac{1}{2}) = -\frac{13}{4}$

Därmed saknar systemet lösningar