Subject: Session 39

Year. Month. Date. ( )

1. $f = x^2 + x + 2y^2$

$g = x^2 + y^2 = 1$

$\nabla f = \langle 2x+1, 4y \rangle$

$\nabla g = \langle 2x, 2y \rangle$

$$\left.\begin{aligned} 2x+1 &= \lambda 2x \\ 4y &= \lambda 2y \\ x^2+y^2 &= 1 \end{aligned}\right\} \lambda = 2,\ x = \tfrac{1}{2},\ y = \pm\frac{\sqrt{3}}{2}$$

$\left(\frac{1}{2}, \pm\frac{\sqrt{3}}{2}\right)$, $(1,0)$, $(-1,0)$

max max min

2. $f = x^2 - xy + y^2$

$g = x^2 + y^2 = 1 \quad x, y \geq 0$

$\nabla f = \langle 2x - y, 2y - x \rangle$

$\nabla g = \langle 2x, 2y \rangle$

$$\left.\begin{aligned} 2x - y &= \lambda 2x \\ 2y - x &= \lambda 2y \\ x^2 + y^2 &= 1 \\ x, y &\geq 0 \end{aligned}\right\} \lambda = \tfrac{1}{2},\ x, y = \pm\frac{1}{\sqrt{2}}$$

$(1,0)$, $(0,1)$, $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

max max min