# MAT235 Tutorial 5 (Oct. 24 – 27)

(1) Consider the surface $S$ given by the equation $z = 4x^2 + y^2 + axy$ where $a$ is some constant. Find the value(s) of $a$, if any, which ensure that $S$ is sloping upward when we move in the positive $y$-direction from the point $(-1, 2)$.

let $z = 4x^2+y^2+axy$.

S sloping upward if $\frac{\partial z}{\partial y}(-1,2) > 0$.

Compute partial derivative:

$$\frac{d}{dy} 4x^2+y^2+axy = 2y + ax \Big|_{(-1,2)}$$

$$= 2(2) + a(-1)$$

$$= 4 - a$$

↳ need this greater than 0.

$$4-a > 0$$

$$\boxed{4 > a}$$

For $a<4$, the equation $4x^2+y^2+axy$ is sloping upward in the $y$ direction.