

1. ▪ $S = \{(x, y) \in \mathbb{R}^2 : f(x, y) = 1\}$
 ▪ $f(x, y) = \frac{1}{4}x^2 - y^2$
 ▪ $a = (2, 0)$

a) $f(2, 0) \stackrel{?}{=} 1$
 $\frac{1}{4}4 = 1 \quad \checkmark$

b) $f_x = 1 \wedge f_y = 0$

c) No porque $f_y = 0$

2. ▪ $S = \{(x, y) \in \mathbb{R}^2 : g(x, y) = 3\}$
 ▪ $g(x, y) = x^5 + y^2 + xy$
 ▪ $a = (1, 1)$

a) $g(1, 1) \stackrel{?}{=} 3$
 $1 + 1 + 1 = 3 \quad \checkmark$

b) $f_x = 5 + 1 = 6 \wedge f_y = 3$

c) Si

d) Por TFI $\phi'(1) = -\frac{f_x(1,1)}{f_y(1,1)} = -2$

3. ▪ $S = \{(x, y, z) \in \mathbb{R}^3 : h(x, y, z) = 0\}$
 ▪ $h(x, y, z) = x^3 + 2y^3 + z^3 - 3xyz - 2y - 8$
 ▪ $a = (0, 0, 2)$

a) $h(0, 0, 2) \stackrel{?}{=} 0$
 $2^3 - 8 = 0 \quad \checkmark$

b) $f_x = 0 \wedge f_y = -2 \wedge f_z = 6$

c) Si

d) Por TFI $\phi'_x(0, 0) = 0 \wedge \phi'_y(0, 0) = -\frac{1}{3}$