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MATH 254H, Fall 2018

QUIZ #2

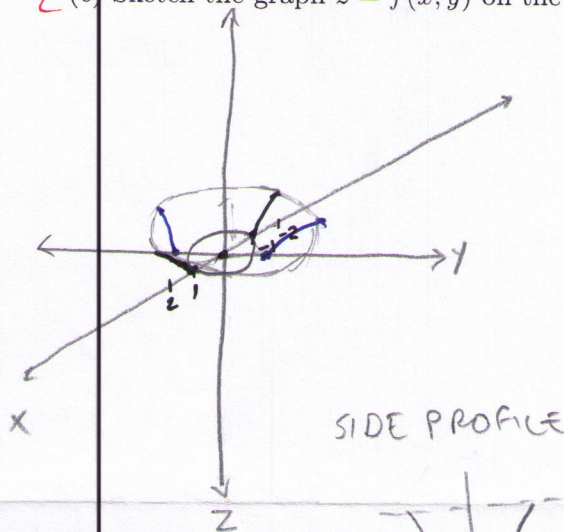
FOR EACH PROBLEM SHOW ALL ESSENTIAL STEPS.

1. For the function $f(x, y) = \sqrt{x^2 + y^2 - 1}$,

3 (a) the domain is $(x, y) \in \mathbb{R}^2 : x^2 + y^2 \geq 1$, and

3 (b) the range is $f \in \mathbb{R} : f \geq 0$ $z \geq 0$

2 (c) Sketch the graph $z = f(x, y)$ on the region where $z \leq 1$.



ZY Plane: $x=0 : z = \sqrt{y^2 - 1}$
 ZX Plane: $y=0 : z = \sqrt{x^2 - 1}$

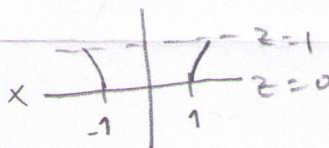
$$\frac{5}{4} - \frac{20}{16} - \frac{16}{16} = \frac{4}{16} = \frac{1}{4}$$

$$1 = \sqrt{x^2 - 1}$$

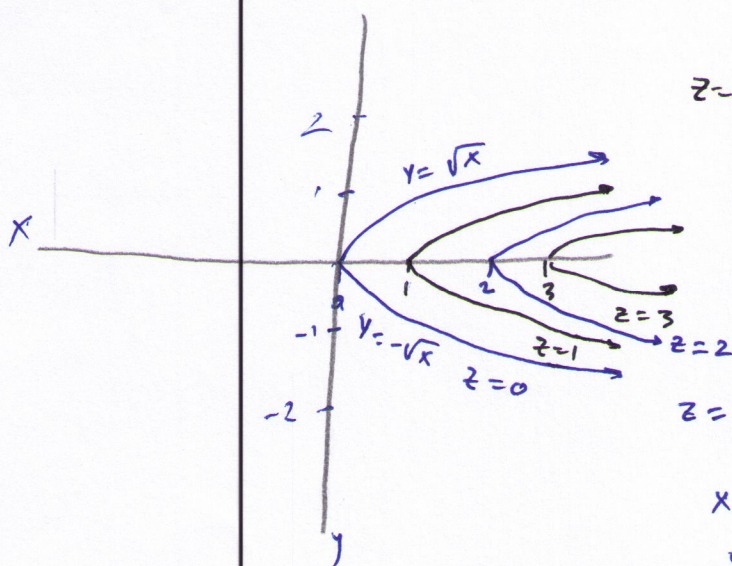
$$1 = x^2 - 1$$

$$2 = x^2$$

SIDE PROFILE



2 2. Graph four level curves of the function $z = x - y^2$ on the domain $[0, 4] \times [-2, 2]$. Label the level curves with their z -values.



$$z = x - y^2$$

$$z=3 \dots 3 = x - y^2$$

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

$$x - 3 = y^2$$

$$y = \pm \sqrt{x - 3}$$

$$z=0 \quad 0 = x - y^2$$

$$x = y^2$$

$$y = \pm \sqrt{x}$$

$$z=2 \quad 2 = x - y^2$$

$$2 - x = -y^2$$

$$x - 2 = y^2$$

$$y = \pm \sqrt{x - 2}$$

$$z=1 \quad 1 = x - y^2$$

$$x - 1 = y^2$$

$$y = \pm \sqrt{x - 1}$$