

Name _____ Date _____

Instructions: Please show all of your work as partial credit will be given where appropriate, **and** there may be no credit given for problems where there is no work shown. All answers should be completely simplified, unless otherwise stated.

1. Let $f(x, y) = \frac{x}{y} + \frac{y}{x}$.

(a) Sketch the surface defined by the above equation:

(b) Sketch the level curves for $f(x, y) = k$ where $k = 0, 1, 2, 3$

(c) What the the domain? Domain:

2. Find the slope of the tangent to the curve of intersection of the surface

$$z = 4x^2 + 3xy^2 - 2xy + \sin\left(\frac{\pi}{2}x\right) + 3y^3 \quad \text{and the plane } x=0 \quad \text{at the point } (0, \quad , \quad) .$$

slope = _____

3. For the above surface $z = 4x^3 + 3xy^3 - 2xy + \sin\left(\frac{\pi}{2}x\right) + 3y^3$ calculate:

(a) $\frac{\partial z}{\partial x}$.

Answer : _____

(b) $\frac{\partial^2 z}{\partial y^2}$

Answer: _____

(c) $\frac{\partial^2 z}{\partial x \partial y}$

Answer: _____