Math 233 - Homework 3

Name _____

October 7, 2021

Score _____

The following problems are from the suggested homework. Show all work to receive full credit. Supply explanations when necessary. This assignment is due October 14.

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1. (3 points) Identify the quadric surface.

   (a) $4x^2 + y^2 - z^2 = 0$

   (b) $z = 4x^2 - y^2$

   (c) $\dfrac{x^2}{4} + \dfrac{y^2}{9} + \dfrac{z^2}{12} = 1$

   (d) $\dfrac{x^2}{4} - \dfrac{y^2}{9} - \dfrac{z^2}{12} = 1$

   (e) $z = 4x^2 + 3y^2$

   (f) $\dfrac{x^2}{4} + \dfrac{y^2}{9} - \dfrac{z^2}{12} = 1$

2. (1 point) Determine the domain of the function $f(x, y) = 4\ln(y^2 - x)$.

3. (1 point) Determine the range of the function $g(x, y) = \sqrt{16 - 4x^2 - y^2}$.

Turn over.

4. (2 points) Let $g(x, y) = \ln\left(\frac{y}{x^2}\right)$. Sketch the level curves $g(x, y) = c$, when $c = 0, 2$.

5. (1 point) Sketch the graph of $f(x, y) = \sqrt{x^2 + y^2}$.

6. (2 points) Evaluate the limit: $\lim_{(x,y)\to(0,0)} \frac{x^2 - xy}{\sqrt{x} - \sqrt{y}}$