Math 283 Quiz 3 Section 5: Sept 19

Name: 

If you cannot complete a problem (perhaps because you forgot a formula) but you think you know how, please describe. Correct methods will receive partial credits.

1. Let \( f(x, y) = \sqrt{x + y - 1} \).

(a) Evaluate \( f(1, 4) \).

\[
\sqrt{1 + 4 - 1} = \sqrt{4} = 2
\]

(b) Find and sketch the domain of \( f \).

\[
x + y - 1 \geq 0
\]

\[
x + y - 1 = 0 \text{ is a line } y = -x + 1.
\]

2. Which of the following best describes the traces of \( z = -x^2 + y^2 \) in \( y = k \) (i.e. parallel to the \( xz \)-plane)?

(a) upward opening parabolas

(b) downward opening parabolas

(c) hyperbolas

(d) circles

3. Find the limit. Extra point: what is the shape of the curve?

\[
limit_{t \to \pi} (\sin t, t, \cos t) = \langle \sin \pi, \pi, \cos \pi \rangle
\]

\[
\text{Helix along } y\text{-axis} \quad = \langle 0, \pi, -1 \rangle.
\]

4. Given a point \( P \) whose cylindrical coordinates are \( (2, 4\pi/3, 3) \), answer the following questions.

(a) Above or below which quadrant is point \( P \) located? (That is, the projected point \( (2, 4\pi/3, 0) \) onto the \( xy \)-plane is in which quadrant?)

(b) What is the point \( P \) called in rectangular coordinates?

\[
\left( -1, -\sqrt{3}, 3 \right)
\]

\[
x = 2 \cos \frac{4\pi}{3}, \quad y = 2 \sin \frac{4\pi}{3}, \quad z = 3.
\]