Math 283 Quiz 3 Section 1: Sept 19

Name: SATOKO

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 \( f(1, 2) \).

      \[
      f(1, 2) = \sqrt{1 + 2 + 1} = 2
      \]

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

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

      \( y = -x - 1 \) is a line with slope \(-1\) and \( y \)-intercept \(-1\).

2. Which of the following best describes the traces of \( z = x^2 - y^2 \) in \( y \) = constant (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?

   \[
   \lim_{t \to \pi/2} (t, \sin t, \cos t) = \left( \frac{\pi}{2}, 0, -1 \right)
   \]

   Sketch a graph along \( x \)-axis:

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

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

      \[
      x = 2 \cos \left( \frac{3\pi}{4} \right) = -\sqrt{2}, \quad y = 2 \sin \left( \frac{3\pi}{4} \right) = \sqrt{2}
      \]

      \[
      \left( -\sqrt{2}, \sqrt{2}, 3 \right)
      \]

      \[
      \left( \frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}, \frac{3}{2} \right)
      \]

      \( -\sqrt{2}, \sqrt{2}, 3 \)

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