Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the derivative of the function at P_0 in the direction of u.

1) $f(x, y) = \tan^{-1} \dfrac{-3x}{y}$, $P_0(-7, -8)$, $u = 12i - 5j$ 1) _____

   A) $\dfrac{456}{6565}$ B) $\dfrac{27}{505}$ C) $\dfrac{477}{6565}$ D) $\dfrac{393}{6565}$

Calculate the circulation of the field F around the closed curve C.

2) $F = (-x - y)i + (x + y)j$, curve C is the counterclockwise path around the circle with radius 3   2) _____
   centered at $(3, 6)$
      A) $18(1 + \pi)$ B) $18(1 + \pi) + 108$ C) 18π D) 36π

Find the potential function f for the field F.

3) $F = \dfrac{1}{z}i - 2j - \dfrac{x}{z^2}k$ 3) _____

      A) $f(x, y, z) = \dfrac{x}{z} - 2 + C$ B) $f(x, y, z) = \dfrac{2x}{z} - 2y + C$

      C) $f(x, y, z) = \dfrac{x}{z} + C$ D) $f(x, y, z) = \dfrac{x}{z} - 2y + C$

Evaluate. The differential is exact.

4) $\displaystyle\int_{(0, 0, 0)}^{(\pi, \pi, \pi)}$ -2 sin x cos x dx - sin y cos z dy - cosy sinz dz   4) _____

      A) -2   B) 2   C) 0   D) 1

Using Green's Theorem, compute the counterclockwise circulation of F around the closed curve C.

5) $F = (x^2 + y^2)i + (x - y)j$; C is the rectangle with vertices at $(0, 0)$, $(8, 0)$, $(8, 5)$, and $(0, 5)$ 5) _____
      A) 160   B) 0   C) -160   D) 240