

American University of Beirut

MATH 202

Differential Equations

Spring 2007

quiz # 1

1. Integrate $f(x, y) = (x + y^2)/\sqrt{1 + x^2}$ along the curve $C : y = \frac{x^2}{2}$ from $(1, 1/2)$ to $(0, 0)$
2. Find the counterclockwise circulation and outward flux of the field $F(x, y) = xy\mathbf{i} + y^2\mathbf{j}$ around and across the boundary of the region enclosed by the curves $y = x^2$ and $y = x$ in the first quadrant
3. Integrate the function $H(x, y, z) = yz$ over the part of the sphere $x^2 + y^2 + z^2 = 4$ that lies above the cone $z = \sqrt{x^2 + y^2}$
4. Use an appropriate parametrization of the cone $z = \sqrt{x^2 + y^2}$, $0 \leq z \leq 1$, to evaluate the surface integral

$$\int \int_S y^2 d\sigma$$

5. Solve the **IVP**: $y'(1 + x^2) + xy = 0$, $y(0) = 1$
6. Solve the **IVP**: $xy' + 3y = x^2$, $y(1) = 2/5$