MA 213 Worksheet #21

Section 16.2

4/4/19

1 Evaluate the line integral, where C is the given curve.

    16.2.1 $\int_C y \, ds,$ $C : x = t^2, y = 2t, 0 \le t \le 3.$

    16.2.10 $\int_C y^2 z \, ds,$ C is the line segment from $(3, 1, 2)$ to $(1, 2, 5).$

    16.2.14 $\int_C y \, dx + z \, dy + x \, dz,$ $C : x = \sqrt{t}, y = t, z = t^2, 1 \le t \le 4.$

2 Evaluate the line integral $\int_C \mathbf{F} \cdot d\mathbf{r},$ where C is given by the function $\mathbf{r}(t).$

    16.2.19 $\mathbf{F}(x, y) = xy^2\mathbf{i} - x^2\mathbf{j},$ $\mathbf{r}(t) = t^3\mathbf{i} + t^2\mathbf{j}, \ 0 \le t \le 1.$

    16.2.22 $\mathbf{F}(x, y, z) = x\mathbf{i} + y\mathbf{j} + xy\mathbf{k},$ $\mathbf{r}(t) = \cos t\,\mathbf{i} + \sin t\,\mathbf{j} + t\mathbf{k}, \ 0 \le t \le \pi.$

3 *16.2.39* Find the work done by the force field $\mathbf{F}(x, y) = x\mathbf{i} + (y + 2)\mathbf{j}$ in moving an object along an arch of the cycloid: $\mathbf{r}(t) = (t - \sin t)\mathbf{i} + (1 - \cos t)\mathbf{j}, \ \ 0 \le t \le 2\pi.$

4 *16.2.43* The position of an object with mass m at time t is $\mathbf{r}(t) = at^2\mathbf{i} + bt^3\mathbf{j}, 0 \le t \le 1.$

    (a) What is the force acting on the object at time t?

    (b) What is the work done by the force during the time interval $0 \le t \le 1$?