

## Math 2471 Calc 3 - Homework #9

Pg. 1053-4, #21, 25, 37, 41, 51, and 53.

Pg. 1065-6, #13, 19, 21, 29 and 33.

Pg. 1053 Find the conservative vector field for the following

$$\#21 \quad f(x, y) = 5x^2 + 3xy + y^2$$

$$\#25 \quad g(x, y, z) = z + ye^{x^2}$$

Pg. 1053 Determine whether the following vector fields are conservative

$$\#29 \quad \vec{F} = xy^2 \vec{i} + x^2y \vec{j}$$

$$\#31 \quad \vec{F} = \sin y \vec{i} + x \sin y \vec{j}$$

Pg. 1053-4 Determine whether the following vector fields are conservative and if so, find the potential function

$$\#37 \quad \vec{F} = (3y - x^2) \vec{i} + (3x + y) \vec{j}$$

$$\#41 \quad \vec{F} = \frac{2y}{x} \vec{i} - \frac{x^2}{y^2} \vec{j}$$

$$\#51 \quad \vec{F} = (3x^2 + yz) \vec{i} + (3y^2 + xz) \vec{j} + (3z^2 + xy) \vec{k}$$

$$\#53 \quad \vec{F} = \sin z \vec{i} + \sin x \vec{j} + \sin y \vec{k}$$

Pg. 1065 Evaluate the line integral

$$\int_C (2x + 3\sqrt{y}) ds \quad (1)$$

13 C: The line segment from (0,0) to (1,0) and (1,0) to (2,4)

$$\#19 \quad \int_C xy ds \quad C: \vec{r}(t) = 4t \vec{i} + 3t \vec{j}, \quad 0 \leq t \leq 1$$

$$\#21 \quad \int_C (x^2 + y^2 + z^2) ds \quad C: \vec{r}(t) = \sin t \vec{i} + \cos t \vec{j} + 2\vec{k}, \quad 0 \leq t \leq \pi/2$$

Pg. 1066 Evaluate  $\int_C \mathbf{F} \cdot d\mathbf{r}$

$$\#29 \quad \mathbf{F}(x, y) = x\mathbf{i} + y\mathbf{j}, \quad C: \mathbf{r}(t) = (3t + 1)\mathbf{i} + t\mathbf{j}, \quad 0 \leq t \leq 1.$$

$$\#33 \quad \mathbf{F}(x, y) = xy\mathbf{i} + xz\mathbf{j} + yz\mathbf{k}, \\ C: \mathbf{r}(t) = t\mathbf{i} + t^2\mathbf{j} + 2t\mathbf{k}, \quad 0 \leq t \leq 1.$$

**Due:** Friday, July 22, 2022.