

Date: July 15, 2009, Wednesday

NAME:.....

STUDENT NO:.....

SECTION NUMBER:

Math 116 Calculus – QUIZ # 9

Question. Evaluate the surface integral

$$I = \iint_S y \, d\sigma$$

where S is the surface $z = x + y^2$, $0 \leq x \leq 1$, $0 \leq y \leq 2$.

Solution: $z = g(x, y) = x + y^2$. Then

$$d\sigma = \sqrt{1 + (g_x)^2 + (g_y)^2} \, dA = \sqrt{2 + 4y^2} \, dA$$

Then

$$I = \int_0^2 \int_0^1 y \sqrt{2 + 4y^2} \, dx \, dy = \int_0^2 y \sqrt{2 + 4y^2} \, dy = \frac{13\sqrt{2}}{3}$$

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Then

$$I = \int_0^1 \int_0^2 z \sqrt{2 + 4z^2} \, dx \, dz = 2 \int_0^1 z \sqrt{2 + 4z^2} \, dz = \sqrt{6} - \frac{\sqrt{2}}{3}$$