MATH 116-002 QUIZ 11

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Student Number:
Section: 2
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Question. Evaluate the surface integral

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

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

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

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