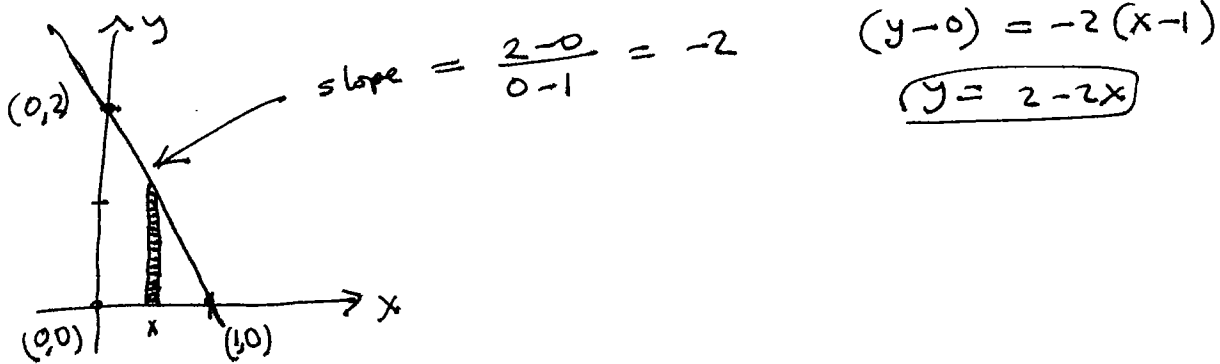


Q1].. Find the double integral of the function  $f(x, y) = 1 + 3x + y$  over the triangular region with vertices  $(0, 0)$ ,  $(1, 0)$  and  $(0, 2)$ .



$$\iint_{\Delta} (1+3x+y) dA = \int_0^1 \left( \int_0^{2-2x} (1+3x+y) dy \right) dx$$

$$= \int_0^1 \left[ (1+3x)y + \frac{y^2}{2} \right]_0^{2-2x} dx$$

$$= \int_0^1 (2 + 4x - 6x^2 + 2(x^2 - 2x + 1)) dx$$

$$= \int_0^1 \cancel{2} - 4x^2 dx = \left[ 4x - \frac{4x^3}{3} \right]_0^1$$

$$= \boxed{\frac{8}{3}}$$