

Test 2 Review

Questions

$$(1) \int_0^x x^2 y^2 dz = x^2 y^2 z \Big|_0^x = x^2 y^2 x$$

$$(2) \int_x^{3x} x^2 y^3 dy = \frac{x^2 y^4}{4} \Big|_x^{3x} = \frac{x^2 (3x)^4}{4} - \frac{x^2}{4} = \frac{80x^6}{4}$$

$$(3) \int_0^1 20x^2 dx = \frac{20x^3}{3} \Big|_0^1 = \frac{20}{3}$$

$$(2) \int_0^1 \int_0^x \int_{2x}^{3x} yz \ln(x^2) dz dy dx$$

$$(1) \int_{2x}^{3x} yz \ln(x^2) dz = \frac{y z^2 \ln(x^2)}{2} \Big|_{2x}^{3x}$$

$$= \frac{9yx^2 \ln(x^2)}{2} - \frac{4yx^2 \ln(x^2)}{2}$$

$$= \int_0^1 \frac{5yx^2 \ln(x^2)}{2} dy \Big|_0^1 = \frac{5x^2 y \ln(x^2)}{4}$$

$$\int_0^1 \frac{x^2 \ln(x^2)}{4} dx, \quad u = x^2 \rightarrow du = 2x dx$$
$$\int_0^1 \frac{\ln(u)}{4} du = -1/4$$