

2.

MA 16020 Quiz 12 (Lessons 27-29)

Write your name, section number (054 for 11:30, 039 for 12:30), and quiz number on the top of your quiz, **front and back**.

You may use a one-line calculator.

Evaluate the following integrals.

1.

$$\int_1^5 \int_0^4 x\sqrt{y} \, dy \, dx$$

2.

$$\iint_R x^2 y \, dA,$$

where R is the region bounded by the lines $y = 0$, $x = 3$ and $y = x$

$$\begin{aligned} \boxed{1} \int_1^5 \int_0^4 x y^{\frac{1}{2}} \, dy \, dx &= \int_1^5 \left[\frac{2}{3} x y^{\frac{3}{2}} \right]_0^4 \, dx = \int_1^5 \frac{2}{3} \cdot 8 \cdot x \, dx = \left[\frac{8}{3} x^2 \right]_1^5 \\ &= \frac{8}{3} (25 - 1) = \frac{8 \cdot 24}{3} = \underline{\underline{64}} \end{aligned}$$

$\boxed{2.}$

$0 \leq x \leq 3$
 $0 \leq y \leq x$

$$\begin{aligned} \iint_R x^2 y \, dA &= \int_0^3 \left(\int_0^x x^2 y \, dy \right) dx = \int_0^3 \left[\frac{x^2 y^2}{2} \right]_0^x dx \\ &= \int_0^3 \frac{x^4}{2} dx = \left[\frac{x^5}{10} \right]_0^3 = \frac{3^5}{10} = \underline{\underline{24.3}} \end{aligned}$$