Answer on Question #40701 – Math – Calculus

Evaluate

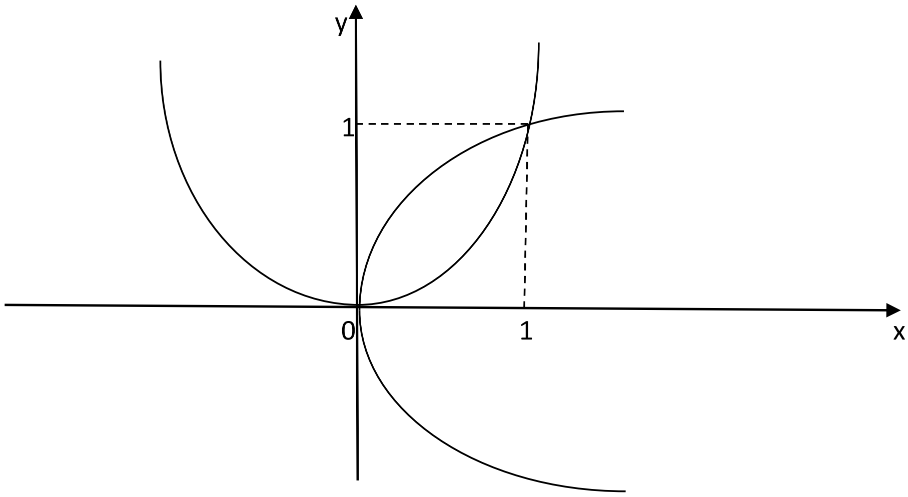
1) ∫∫ (3x+4y)dydx over the region R enclosed between the curves x=y^2 and y=x^2
R

1 x^2
2) ∫ ∫ y^2x dydx
0 -x

Soluiton:

2) $\int_0^1 dx \int_{-x}^{x^2} y^2 x\, dy = \int_0^1 dx \cdot \frac{xy^3}{3} |_{-x}^{x^2} = \int_0^1 \left(\frac{x^7}{3} + \frac{x^3}{3}\right) dx = \left(\frac{x^8}{24} + \frac{x^4}{12}\right) |_0^1 = \frac{1}{24} + \frac{1}{12} = \frac{3}{24} = \frac{1}{8}.$

1) Let sketch the region R:



∫∫ (3x+4y)dydx over =
R

$$= \int_0^1 dx \int_{x^2}^{\sqrt{x}} (3x + 4y) dy = \int_0^1 dx \cdot \left(3xy + \frac{4y^2}{2}\right) |_{x^2}^{\sqrt{x}} = \int_0^1 \left(3x\sqrt{x} + 2x - 3x^3 - 2x^4\right) dx =$$

$$= \left(\frac{6}{5}x^{\frac{5}{2}} + x^2 - \frac{3}{4}x^4 - \frac{2}{5}x^5\right) |_0^1 = \frac{6}{5} + 1 - \frac{3}{4} - \frac{2}{5} = \frac{9}{5} - \frac{3}{4} = \frac{21}{20}.$$

Answer: 1) $\frac{21}{20}$; 2) $\frac{1}{8}$.