

Answer on Question #70111 – Math – Calculus

Question

Find the area bounded by

$$a^2y^2 = a^2x^2 - x^4$$

Solution

$$y = \frac{x}{a} \sqrt{a^2 - x^2}$$

$$S = 4 \int_0^a \frac{x}{a} \sqrt{a^2 - x^2} dx = \frac{4}{a} \int_0^a \frac{\sqrt{a^2 - x^2}}{2} d(x^2) = -\frac{4}{3a} (a^2 - x^2)^{3/2} \Big|_0^a$$

$$S = \frac{4}{3a} \cdot a^3 = \frac{4a^2}{3}$$

Answer: $\frac{4a^2}{3}$.