

15. Find the critical points of the function $f(x, y) = xy(2 - x - y)$ and classify them as local maxima, minima, or saddle points.
16. Find the critical points of the function $f(x, y) = (1 + x^2) \sin y$ and classify them as local maxima, minima, or saddle points. [This function has an infinite number of critical points. You may want to look at a computer graph.]
17. Find the extrema of $f(x, y) = x^2 + y^2$ on the curve $g(x, y) = y - 2x^2 = 1$.
18. Find the extrema of $f(x, y) = x^2 + y^2$ on the curve $g(x, y) = y - 2x^2 = -1$.
19. Find the extrema of $f(x, y) = y - 2x^2$ on the curve $g(x, y) = x^2 + y^2 = 1$.
20.
$$\int_0^a \int_0^b xy(x^2 - y^2) dy dx.$$
21.
$$\int_0^\pi \int_0^\pi \cos(x + y) dy dx.$$
22.
$$\int_0^2 \int_0^{2-x} y dy dx.$$
23.
$$\int_1^e \int_1^2 \frac{1}{xy} dy dx.$$
24.
$$\int_0^a \int_0^b xe^{xy} dy dx.$$
25. Write $\int_0^1 \int_{x^2}^x y dy dx$ as an iterated integral in the other order. Evaluate both.
26. Find the volume between the xy -plane and the paraboloid $z = 2 - x^2 - y^2$.
27. Find the volume of the smaller portion of the sphere of radius a cut by a plane at distance b from its center.
29. Find the volume of the wedge cut from a cylinder of radius a and height b by a plane through a diameter of the base and a point on the circumference of the top.

Answers for integrals: -4 , $\frac{1}{15}$, $\ln 2$, $\frac{4}{3}$, 2π , $\frac{2}{3}a^2b$, $\frac{1}{8}a^2b^2(a^2 - b^2)$, $\frac{\pi}{3}(2a + b)(a - b)^2$, $\frac{1}{b}(e^{ab} - 1) - a$.