

Problem Set 2

For each problem, represent the area of the relevant region using definite integrals.

(a) The region bounded by $y = e^{\sqrt{x}}$, $y = e$, and the y -axis.

(b) The region bounded by $y = \sqrt{x-1}$, $x - y = 2$, and the vertical line $x = 1$.

(c) The region between $y = 4 - x^2$ and $y = |x|$.

(d) The region bounded by $y = \frac{1}{x+1}$ and $y = 5 - x$.

(e) The region between the curves $y = \sin x$ and $y = 2 \sin 2x$ over the interval $[-\pi, \pi]$.

(f) The region residing in the first and second quadrant bounded by the circle of radius 3 centered at the origin, the line $y = x$, and the x -axis.

(g) What must be true for a region, if the area cannot be represented by a single definite integral with respect to x or y ?

(h) True or False: $\int_a^b (f(x) - g(x)) dx = \int_a^b |f(x) - g(x)| dx$. Explain your answer.