

Assignment # 3

Due 6-19-06

- (1) Determine whether the integral converges or diverges. Find the value of the integral if it converges.

(a) $\int_0^1 x^{-\frac{4}{5}} dx$

(b) $\int_0^1 x^{-\frac{6}{5}} dx$

(c) $\int_1^{\infty} x^{-\frac{4}{5}} dx$

(d) $\int_1^{\infty} x^{-\frac{6}{5}} dx$

(e) $\int_{-4}^4 \frac{2x}{x^2 - 1} dx$

(f) $\int_{-\infty}^{\infty} \frac{1}{x^2 - 1} dx$

(g) $\int_0^1 \frac{2}{x\sqrt{1-x^2}} dx$

- (2) Sketch the region enclosed by the given curves. Decide whether to integrate with respect to x or y . Draw a typical approximating rectangle and label its height and width. Then find the area of the region.

$$x + y^2 = 2, \quad x + y = 0$$

- (3) Use a graph to find approximate x -coordinates of the points of intersection of the given curves. Then find (approximately) the area of the region bounded by the curves.

$$y = e^x, \quad y = 2 - x^2$$

(4) Consider the curve $y = \frac{1}{x^2}$, $1 \leq x \leq 4$.

(a) Find the number a such that the line $x = a$ bisects the area under the curve.

(b) Find the number b such that the line $y = b$ bisects the area in part (a).