Math 152 Calculus and Analytic Geometry II

Sec 6.1 Areas between curves

We can use definite integrals to find areas between two curves as follows:

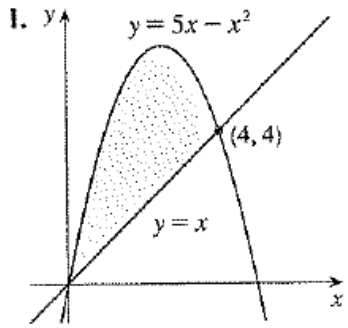
$$Area = \lim_{n\to\infty} \sum_{i=1}^{n} (height)\Delta x \qquad \lim_{n\to\infty} \sum_{i=1}^{n} \left(f(x_i) - g(x_i)\right)\Delta x$$

The Area A of the region bounded by the curves y=f(x) and y=g(x) and the lines x=a, x=b, where f(x) and g(x) are continuous and f(x)≥g(x) for all x in [a,b], is

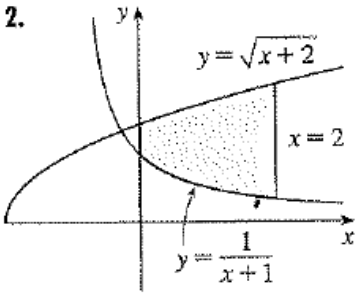
$$A = \int_a^b \left(f(x_i) - g(x_i)\right)dx$$

Examples:

1.



2.



Find the area of the region bounded by:

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

Find the area of the region bounded by:

$y = x - 1 \quad x = 3 - y^2$

Find the area of the region bounded by:

$y = \sqrt{x}$ $y = 6 - x$ and the x-axis

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Do it again with horizontal rectangles

Find the area of the region bounded by:

$y = (x-3)(x-1) \quad y = x$

Review Problems from Chapter 5 Review (Page 431)

Try the following problems: 2(a,b,c,d), 4, 7, 8, 9-31 odd , 43, 45, 47

Harder... 66, 67, 68, 69, 70