

## Math 141: Section 5.6 Area Between Curves - Notes

**Definition:** If  $f$  and  $g$  are continuous with  $f(x) \geq g(x)$  throughout  $[a, b]$ , then the **area of the region between the curves**  $y = f(x)$  **and**  $y = g(x)$  **from a to b** is the integral of  $(f - g)$  from  $a$  to  $b$ :

$$A = \int_a^b [f(x) - g(x)] dx$$

**Example 1** Find the area of the region bounded above by the curve  $y = 2e^{-x} + x$ , below by the curve  $y = e^x/2$ , on the left by  $x = 0$ , and on the right by  $x = 1$ .

**Example 2** Find the area of the region enclosed by the parabola  $y = 2 - x^2$  and the line  $y = -x$ .

**Example 3** Find the area of the region in the first quadrant that is bounded above by  $y = \sqrt{x}$  and below by the  $x$ -axis and the line  $y = x - 2$ .