Section 6.6: Area Between Two Curves

Question: How can we use definite integrals to find the area between two continuous functions on an interval?

Theorem: If $f(x)$ and $g(x)$ are two continuous functions with $f(x) \geq g(x)$ on $[a,b]$, then the area between the two curves on $[a,b]$ is given by

Example 1: Find the area that is bounded by the curves $y = x$ and $y = \dfrac{1}{2}x^2 + 2$ on $[-4,3]$.

Example 2: Find the area that is bounded by $y = 5 - x^2$ and $y = 2 - 2x$.

Example 3: Find the area that is bounded by $y = \ln x$ and $y = 1$ on $[1,5]$.

Example 4: Find the area that is bounded by $y = x^2 - 1$ and the *x*-axis on $[0, 2]$.

Example 5: Find the area that is bounded by $y = -x^2$ and $y = 2x^3 - 5x$.

Example 6: Find the area that is bounded by $y = x^2 - x$ and $y = 2x$ on $-2 \le x \le 4$.

Example 7: Set up the definite integral(s) representing the area bounded by $y = -x^2 + 10x - 17$ and the x-axis on $[5, B]$, where $B > 8$.