Sometimes, we will be asked to find the area of regions that look like this:

\[ \int_a^{x_1} f(x) - g(x) \, dx + \int_{x_1}^{x_2} g(x) - f(x) \, dx + \int_{x_2}^{b} f(x) - g(x) \, dx = \int_a^b |f(x) - g(x)| \, dx \]

**Example:** Find the area bounded by \( x = \frac{\pi}{4}, x = \pi, y = \sin(x), \) and \( y = \cos(x) \).

\[ \int_0^{\pi/4} \cos(x) - \sin(x) \, dx + \int_{\pi/4}^{\pi} \sin(x) - \cos(x) \, dx = \left[ \sin(x) + \cos(x) \right]_0^{\pi/4} + \left[ \sin(x) - \cos(x) \right]_{\pi/4}^{\pi} = \sqrt{2} - 1 + (1 + (\sqrt{2})) = 2\sqrt{2} \]