These are alleged answers. For each error herein, you get extra-credit points for being the first to report it by e-mail.

1

\[ A = \int_0^{\pi/4} (\cos(x) - \sin(x)) \, dx + \int_{\pi/4}^{\pi/2} (\sin(x) - \cos(x)) \, dx \]

\[ = 2 \int_0^{\pi/4} (\cos(x) - \sin(x)) \, dx \]

\[ = 2 \left\{ \sin(x) + \cos(x) \bigg|_0^{\pi/4} \right\} \]

\[ = 2 \{ (\sin(\pi/4) + \cos(\pi/4)) - (\sin(0) + \cos(0)) \} \]

\[ = 2 \left\{ \left( \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \right) - (0 + 1) \right\} \]

\[ = 2 \left\{ \sqrt{2} - 1 \right\} = 2\sqrt{2} - 2 \]