$$\int \frac{1}{x^2 + 2x - 25}\, dx$$

Solution

The denominator of $\frac{1}{x^2+2x-25}$ won't factor using integers, but the roots can be obtained using the quadratic formula, and we'll see in a moment that this quadratic still factors. Taking $x^2 + 2x - 25$, the two roots are

$$x = \frac{-2 \pm \sqrt{2^2 - 4 \cdot 1 \cdot (-25)}}{2} = \frac{-2 \pm \sqrt{104}}{2}.$$