
Complete the following problems. Show all work to receive full credit.

1. Evaluate the following integrals:

$$\begin{aligned} \text{(a)} \quad & \int \frac{8}{x^2 - 2x + 2} dx \\ &= \int \frac{8}{x^2 - 2x + 1 - 1 + 2} dx \\ &= \int \frac{8}{(x-1)^2 + 1} dx \\ &= 8 \tan^{-1}(x-1) + C \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad & \int \frac{x + 2\sqrt{x-1}}{2x\sqrt{x-1}} dx \\ &= \int \frac{x}{2x\sqrt{x-1}} + \frac{2\sqrt{x-1}}{2x\sqrt{x-1}} dx \\ &= \int \frac{1}{2\sqrt{x-1}} + \frac{1}{x} dx \\ &= \sqrt{x-1} + \ln|x| + C \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & \int \sqrt{\sec^2 x - 1} dx \\ &= \int \sqrt{\tan^2 x} dx \\ &= \int \tan x dx \\ &= \ln|\sec x| + C \end{aligned}$$