

$$\int_3^8 \frac{1}{\sqrt{x-3}} dx = \lim_{t \rightarrow 3^+} \int_t^8 \frac{1}{\sqrt{x-3}} dx$$

$$\begin{aligned} \text{Indef } \int \frac{1}{\sqrt{x-3}} dx & \quad u = x-3 \quad du = dx \\ & \rightarrow \int \frac{1}{\sqrt{u}} du = \int u^{-1/2} du = \frac{u^{1/2}}{1/2} + C = 2\sqrt{x-3} + C \end{aligned}$$

$$= \lim_{t \rightarrow 3^+} (2\sqrt{8-3} + 2\sqrt{t-3})$$

$$= 2\sqrt{5} - 2\sqrt{0} = 2\sqrt{5}$$