

2. (10 pts.) Evaluate

$$\begin{aligned} &= \lim_{b \rightarrow 0^-} \int_{-1}^b \frac{dx}{\sqrt{|x|}} + \lim_{b \rightarrow 0^+} \int_b^4 \frac{dx}{\sqrt{|x|}} \\ &= \lim_{b \rightarrow 0^-} \int_{-1}^b \frac{dx}{\sqrt{-x}} + \lim_{b \rightarrow 0^+} \int_b^4 \frac{dx}{\sqrt{x}} \\ &= \lim_{b \rightarrow 0^-} \int_{-1}^b (-x)^{-\frac{1}{2}} dx + \lim_{b \rightarrow 0^+} \int_b^4 x^{-\frac{1}{2}} dx \\ &= \lim_{b \rightarrow 0^-} \left[-2(-x)^{\frac{1}{2}} \right]_{-1}^b + \lim_{b \rightarrow 0^+} \left[2(x)^{\frac{1}{2}} \right]_b^4 \\ &= \lim_{b \rightarrow 0^-} -2\sqrt{-b} + 2\sqrt{1} + 2\sqrt{4} - \lim_{b \rightarrow 0^+} 2\sqrt{b} \\ &= 2 + 4 = 6 \end{aligned}$$