

$$\int_0^1 \frac{1}{x^2} dx = \lim_{a \rightarrow 0^+} \int_a^1 \frac{1}{x^2} dx$$

$$= \lim_{a \rightarrow 0^+} \left. -\frac{1}{x} \right|_a^1$$

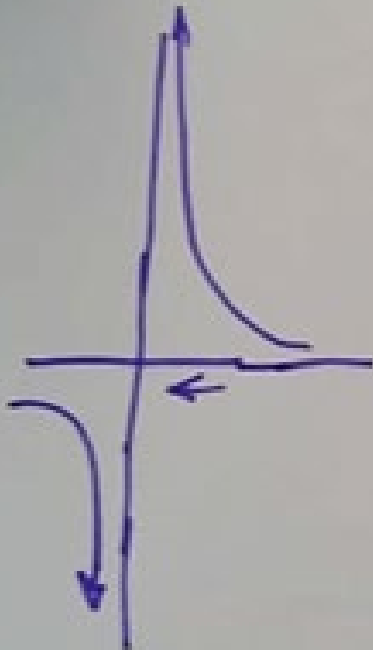
$$= \lim_{a \rightarrow 0^+} \left(-\frac{1}{1} - \left(-\frac{1}{a} \right) \right)$$

$$= \lim_{a \rightarrow 0^+} \left(-1 + \frac{1}{a} \right)$$

$$= \lim_{a \rightarrow 0^+} (-1) + \lim_{a \rightarrow 0^+} \frac{1}{a}$$

$$= \underbrace{-1}_{-1} + \infty$$

$$= \infty - 1 = \infty$$



$$\int_0^1 \frac{1}{x} dx = \lim_{a \rightarrow 0^+} \int_a^1 \frac{1}{x} dx$$

$$= \lim_{a \rightarrow 0^+} \ln x \Big|_a^1$$

$$= \lim_{a \rightarrow 0^+} (\ln 1 - \ln a)$$

$$= \lim_{a \rightarrow 0^+} (-\ln a) = (-(-\infty)) = \infty$$

