

2. Determine whether the **improper** integral

$$\int_4^5 \frac{1}{\sqrt{x-4}} dx$$

is convergent. If it is convergent, find its value. (5 points)

① $x=4$ is the only discontinuous point for $\frac{1}{\sqrt{x-4}}$

$$\textcircled{2} \int_4^5 \frac{1}{\sqrt{x-4}} dx = \lim_{t \rightarrow 4^+} \int_t^5 \frac{1}{\sqrt{x-4}} dx$$

$$= \lim_{t \rightarrow 4^+} \left(2\sqrt{x-4} \Big|_t^5 \right)$$

$$= \lim_{t \rightarrow 4^+} \left(2\sqrt{5-4} - 2\sqrt{t-4} \right)$$

$$= 2$$

so it is convergent, the value is 2.