

$$55. \int_{\pi}^{\infty} \frac{2 + \cos x}{x} dx$$

$$\lim_{x \rightarrow \infty} \frac{\frac{2 + \cos x}{x}}{\frac{1}{x}} \quad \begin{matrix} \text{X} \\ \uparrow \end{matrix} \quad 2 + \cos x < \infty$$

$$= \lim_{x \rightarrow \infty} 2 + \cos x$$

$$\int_{\pi}^{\infty} \frac{1}{x} dx \text{ diverges}$$

$$\Rightarrow \int_{\pi}^{\infty} \frac{2 + \cos x}{x} dx \text{ diverges.}$$

D.N.E

Can not use limit comparison.

Use direct comparison:

$$1/x \leq (2 + \cos x)/x$$

ans: divergent.