$$\int_4^{\infty} \frac{5+\sin(x)}{1+x^8}\,dx$$

$\sin x \le 1$

$5+\sin(x) \le 6$

$$\frac{5+\sin(x)}{1+x^8} \le \frac{6}{1+x^8}$$

$1 \ge 0$

$1+x^8 \ge x^8$

$$\frac{1}{1+x^8} \le \frac{1}{x^8}$$

$$\frac{6}{1+x^8} \le \frac{6}{x^8}$$

$$\frac{5+\sin(x)}{1+x^8} \le \frac{6}{x^8}$$

$\int_1^{\infty} \frac{1}{x^8}\,dx$ converges since p is 8 and $p>1$.

So $\int_4^{\infty} \frac{6}{x^8}\,dx$ converges

By the Comparison Theorem, $\int_4^{\infty} \frac{5+\sin(x)}{1+x^8}\,dx$ converges