(39) $\sum_{n=4}^{\infty}\left(1+\frac{1}{n}\right)^{-n^2}$

$$\left(\left(1+\frac{1}{n}\right)^{n}\right)^{-n} \to e^{-n} \to \frac{1}{e^n} \to 0$$

Root Test: $\sqrt[n]{\left(1+\frac{1}{n}\right)^{-n^2}} = \left(1+\frac{1}{n}\right)^{-n}$

$$= \frac{1}{\left(1+\frac{1}{n}\right)^n} \to \frac{1}{e} < 1$$

$\sum$ converges by Root Test

49 $\sum_{n=1}^{\infty} \sin \frac{1}{n^2}$ $\qquad \dfrac{\frac{1}{n^2}}{\sin \frac{1}{n^2}} = \dfrac{n^{-2}}{\sin(n^{-2})}$

$$\xrightarrow{LH} \frac{\cancel{-2n^{-3}}}{\cos(n^{-2})\,\cancel{(-2n^{-3})}} = \frac{1}{\cos \frac{1}{n^2}} \to 1$$

L.C.T.

$\sum$ converges $\qquad \frac{1}{n^2}$

$$e^x - y' = y^3 + 3xy^2y'$$

$$e^2 - y' = 8 + 3(2)(4)y'$$

$$e^2 - y' = 8 + 24y'$$

$$e^2 - 8 = 25y'$$

$$y' = \frac{e^2 - 8}{25}$$

C

6 $2(12) + 5(7) + 2(4.5)$

$24 + 35 + 9$

68

A