p573

1) $\sum_{n=1}^{\infty} \frac{1}{n^2}$ p-series $p = 2 > 1$ ∴ series converges

$\frac{1}{n^2+1} < \frac{1}{n^2}$ ∴ $\sum_{n=1}^{\infty} \frac{1}{n^2+1}$ converges by DCT

3) $\sum_{n=2}^{\infty} \frac{1}{n}$ p-series $p = 1 \leq 1$ ∴ series diverges

$\frac{1}{n-1} > \frac{1}{n}$ ∴ $\sum_{n=2}^{\infty} \frac{1}{n-1}$ diverges by DCT

5) $\sum_{n=0}^{\infty} \frac{1}{3^n}$ geometric series $r = \frac{1}{3} < 1$ ∴ series converges

$\frac{1}{3^n+1} < \frac{1}{3^n}$ ∴ $\sum_{n=0}^{\infty} \frac{1}{3^n+1}$ converges by DCT

7) $\sum_{n=2}^{\infty} \frac{1}{n}$ p-series $p = 1 \leq 1$ ∴ series diverges

$\frac{\ln n}{n+1} > \frac{1}{n}$ ∴ $\sum_{n=2}^{\infty} \frac{\ln n}{n+1}$ diverges by DCT

$n > 4$

9)

$\frac{1}{n!} < \frac{1}{n}$ Div inconclusive

$\frac{1}{n!} < \frac{1}{n^2}$ Con converge by DCT

11) $\sum_{n=0}^{\infty} \frac{1}{e^n}$ geometric series $r = \frac{1}{e} = .368 < 1$ ∴ series converges

$\frac{1}{e^{n^2}} < \frac{1}{e^n}$ ∴ $\sum_{n=0}^{\infty} e^{-n^2}$ converges by DCT