Calculus Section 9.6 Root Test
-Use the root test to determine convergence or divergence

Homework: page 633 #’s 35 – 49 odd

The final test to determine convergence or divergence is the root test. The root test is especially well suited to solve series involving nth powers.

**Root Test**
Let ∑an be a series.
1) ∑an converges absolutely if
2) ∑an diverges if
3) The Root Test is inconclusive if

$$\lim\_{n\to \infty }\sqrt[n]{\left|a\_{n}\right|}=1$$

$$\lim\_{n\to \infty }\sqrt[n]{\left|a\_{n}\right|}>1$$

$$\lim\_{n\to \infty }\sqrt[n]{\left|a\_{n}\right|}<1$$

**Example) Using the Root Test**
1) 2)

$$\sum\_{n=1}^{\infty }\left(\frac{-3n}{2n+1}\right)^{n}$$

$$\sum\_{n=1}^{\infty }\frac{e^{2n}}{n^{n}}$$

$$\sum\_{n=1}^{\infty }\frac{n}{2^{n}}$$

$$\sum\_{n=1}^{\infty }\frac{\left(n!\right)^{n}}{\left(n^{n}\right)^{2}}$$

3) 4)