

Day 2 on 11-4

Did you notice from yesterday...

If $n < m$ $\lim_{x \rightarrow \infty} f(x) = 0$

If $n = m$ $\lim_{x \rightarrow \infty} f(x) = \text{ratio of leading coefficients}$

If $n > m$ $\lim_{x \rightarrow \infty} f(x) = \text{D.N.E.}$

I. Limits of Sequences

$\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \dots$

$\lim_{n \rightarrow \infty} \frac{1}{2^n} = 0$

converges to 0

II. Write the first 5 terms and find the limit. Assume n begins with 1.

with 1.

Ex 1) $\lim_{n \rightarrow \infty} \frac{2n+1}{n+4}$

$= 2$

$n=1 \quad n=2 \quad n=3 \quad n=4 \quad n=5$
 $\frac{3}{5}, \frac{5}{6}, 1, \frac{9}{8}, \frac{11}{9}$

Ex 2) $\lim_{n \rightarrow \infty} \frac{2n+1}{n^2+4} = 0$

$\frac{3}{5}, \frac{5}{8}, \frac{7}{13}, \frac{9}{20}, \frac{11}{29} \rightarrow 0$

Ex 3) $\lim_{n \rightarrow \infty} \frac{2n^2+1}{4n^2}$

$= \frac{2}{4} = \frac{1}{2}$

$\frac{3}{4}, \frac{9}{16}, \frac{19}{36}, \frac{33}{64}, \frac{51}{100} \rightarrow \frac{1}{2}$

$$\text{Ex 4) } \lim_{n \rightarrow \infty} \frac{(-1)^n}{n} = 0$$

$$-1, \frac{1}{2}, -\frac{1}{3}, \frac{1}{4}, -\frac{1}{5} \Rightarrow 0$$

$$\frac{+1111}{0}$$

$$\text{Ex 5) } \lim_{n \rightarrow \infty} \frac{n^2}{3n+2} = \text{D.N.E.}$$

$$\frac{1}{5}, \frac{1}{2}, \frac{9}{11}, \frac{16}{14}, \frac{25}{17} \rightarrow \infty$$