Math 1172 HW #9

Section 11.1 # 19, 31, 71, 84

#19 $\{-3, 2, -4/3, 8/9, \ldots\}$

each one is $-\frac{2}{3}$ times the previous.

so its $a_n = -3 \cdot \left(-\frac{2}{3}\right)^{n-1}$

#31 $a_n = \dfrac{n^4}{n^3 - 2n}$

$$\lim_{n\to\infty} a_n = \lim_{n\to\infty} \frac{n^4}{n^3-2n} = \lim_{n\to\infty} \frac{n^4/n^4}{n^3/n^4 - 2n/n^4} = \lim_{n\to\infty} \frac{1}{\frac{1}{n} - \frac{2}{n^3}} = \frac{1}{0}$$

<u>diverges</u>

#71 $a_n = 1000\,(1.06)^n$

a. $a_1 = 1000 \cdot 1.06 = 1060$

$a_2 = 1000 \cdot 1.06^2 = 1123.6$

$a_3 = \ldots\ldots^3 = 1191.0$

$a_4 \quad \ldots\ldots^4 = 1262.4$

$a_5 = \quad = 1338.2$

b. It is a geometric seq. with $r = 1.06$,

since $|r| > 1$ it <u>diverges</u>

84

$a_n = n^3 - 3n + 3$ it is <u>increasing</u>

WTS $a_{n+1} > a_n$

WTS $(n+1)^3 - 3(n+1) + 3 > n^3 - 3n + 3$

WTS $\cancel{n^3} + 3n^2 + \cancel{3n} + 1 - \cancel{3n} - \cancel{3} + \cancel{3} > \cancel{n^3} - 3n + 3$

WTS $3n^2 + 1 > -3n + 3$

WTS $3n^2 + 3n > 2$

WTS $3(\underline{n^2 + n}) > 2$

this is true since this is a whole #.