Math 1172 Homework #8

Section 11.1 #19, 31, 71, 84

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

mult by $-2/3$ each time

$r = -2/3$, $a = -3$

$$a_n = -3(-2/3)^{n-1}$$

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

$$\lim a_n = \lim \frac{n^4}{n^3 - 2n} = \lim \frac{1}{\frac{1}{n} - \frac{2}{n^3}} = \frac{1}{0} \quad \text{DNE}$$

diverges

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

a $a_1 = 1000 \cdot 1.06 = 1060.00$

$a_2 = 1000 \cdot 1.06^2 = 1123.60$

$a_3 = 1000 \cdot 1.06^3 = 1191.01$

$a_4 = 1000 \cdot 1.06^4 = 1262.48$

b It's geometric with $r = 1.06$.

$r > 1$, so it diverges

#84 $a_n = n^3 - 3n + 3$ is increasing

Pf Want to show $a_n < a_{n+1}$

same as: $n^3 - 3n + 3 < (n+1)^3 - 3(n+1) + 3$

$n^3 - 3n + 3 < n^3 + 3n^2 + 3n + 1 - 3n - 3 + 3$

Simplify: $n^3 - 3n + 3 < n^3 + 3n^2 + 1$

$2 < 3n + 3n^2$

true since $n \geq 1$

So it is increasing.