Math 1172
Homework #9

Section 11.1 # 65/71, 78/84
Section 11.2 # 17/23, 58/60

11.1 #65

$$I_n = 1000(1.06)^n$$

a) first 5 terms: $1000 \cdot 1.06,\quad 1000 \cdot 1.06^2, \ldots, \quad 1000 \cdot 1.06^5$

$a = 1000 \cdot 1.06, \qquad r = 1.06$

b) It diverges because $r = 1.06$, which is greater than 1.

11.1 #78 $\quad a_n = n^3 - 3n + 3$ is increasing

we need to show $a_{n+1} > a_n$

i.e. show $(n+1)^3 - 3(n+1) + 3 > n^3 - 3n + 3$

which is same as: $n^3 + 3n^2 + 3n + 1 - 3n - 3 + 3 > n^3 - 3n + 3$

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

So we need to show $3n^2 + 3n > 2$,

which is true since $n \geq 1$.

11.2 #17/23

$3 - 4 + \frac{16}{3} - \frac{64}{9} + \cdots$

This is geometric: $a = 3$, $r = \frac{-4}{3}$,

$|r| = \frac{4}{3} > 1$ so it diverges.

11.2 #58/60

$\sum_{n=1}^{\infty} (x+2)^n$ this is geometric

$a_1 = x+2 \qquad a_2 = (x+2)^2 =$

$a = x+2, \qquad r = \frac{(x+2)^2}{x+2} = x+2$

so it converges for all x where $|x+2| < 1$

That is, $-1 < x+2 < 1$,

i.e. $\boxed{1 < x < 3}$