Problem sheet

2nd Feb

1. Which of the following converge? If so, what are the limits?

(a) $\left\{ \frac{\pi^n}{1+2^{2n}} \right\}$

(b) $\left\{ \frac{n^2 - n + 7}{n+5} \right\}$

(c) $\left\{ \frac{4^{n+1} + n^5 3^n}{2^{n+6} + 2^{2n+1}} \right\}$

(d) $\left\{ \frac{(-1)^n \sin(n)}{n} \right\}$

2. Define

$$a_1 := 80$$

$$a_n = 100 - \frac{2}{5} a_{n-1}.$$

Show that $\{a_n\}$ converges.
Compute its limit.

3. For what values of p do

(a) $\{p^n \sin(n)\}$

(b) $\left\{ \frac{p^n}{n!} \right\}$ * Difficult question!

converge?
When they converge, what are their limits?