

Ex 1

a) $\lim_{n \rightarrow +\infty} n^3 \left(1 - \frac{5}{n} + \frac{2}{n^3}\right) = +\infty$

b) $\lim_{m \rightarrow +\infty} (3m+2)(1-m) = -\infty$

c) $\lim_{m \rightarrow +\infty} \frac{1 - \frac{1}{m^2}}{1 + \frac{1}{m^2}} = 1$

d) $\lim_{m \rightarrow +\infty} \frac{5}{2\sqrt{m}-1} = 0$

e) $\lim_{m \rightarrow +\infty} 2m^3 + 3m - 1 = +\infty$

f) $\lim_{m \rightarrow +\infty} \frac{m \left(1 - \frac{2}{m}\right)}{1 + \frac{3}{m}} = +\infty$

g) $\lim_{m \rightarrow +\infty} (5m-1) \left(3 + \frac{1}{m}\right) = +\infty$

h) $\lim_{m \rightarrow +\infty} m^2 \left(-2 + \frac{10}{m}\right) = -\infty$

i) $\lim_{m \rightarrow +\infty} \frac{3 + \frac{1}{m}}{m \left(1 + \frac{2}{m}\right)} = 0$

j) $\lim_{m \rightarrow +\infty} \frac{2}{3 + \frac{5}{m}} = \frac{2}{3}$

k) $\lim_{m \rightarrow +\infty} 6 - \frac{2}{m+3} = 6$

l) $\lim_{m \rightarrow +\infty} m \left(2 - \frac{1}{\sqrt{m}}\right) = +\infty$

k) $\lim_{m \rightarrow +\infty} 6 - \frac{2}{m+3} = 6$

l) $\lim_{m \rightarrow +\infty} m \left(2 - \frac{1}{\sqrt{m}}\right) = +\infty$

m) $\lim_{m \rightarrow +\infty} \frac{6 + \frac{3}{m} + \frac{5}{m^2}}{2 - \frac{5}{m} + \frac{1}{m^2}} = 3$

m) $\lim_{m \rightarrow +\infty} \frac{3}{\sqrt{m}} - 5m = -\infty$

o) $\lim_{m \rightarrow +\infty} \frac{2 + \frac{3}{m^3}}{m \left(5 - \frac{8}{m^2} + \frac{1}{m^3}\right)} = 0$

Ex 2
théorème des gendarmes { a) $-\frac{1}{m} \leq u_n \leq \frac{1}{m}$ d'où $\lim_{m \rightarrow +\infty} u_n = 0$ car $\lim_{m \rightarrow +\infty} \frac{1}{m} = \lim_{m \rightarrow +\infty} -\frac{1}{m} = 0$
b) $-\frac{1}{m} \leq u_n \leq \frac{1}{m}$ d'où $\lim_{m \rightarrow +\infty} u_n = 0$ car $\lim_{m \rightarrow +\infty} -\frac{1}{m} = \lim_{m \rightarrow +\infty} \frac{1}{m} = 0$

par comparaison { c) $u_n \geq m^2 - m = m(m-1)$ d'où $\lim_{m \rightarrow +\infty} u_n = +\infty$ car $\lim_{m \rightarrow +\infty} m(m-1) = +\infty$
d) $u_n \leq n - n$ d'où $\lim_{m \rightarrow +\infty} u_n = -\infty$ car $\lim_{m \rightarrow +\infty} n - n = -\infty$
e) $u_n \geq n - 3$ d'où $\lim_{m \rightarrow +\infty} u_n = +\infty$ car $\lim_{m \rightarrow +\infty} n - 3 = +\infty$