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2HR

a) $\lim_{n\to\infty} \frac{2n^2-3}{4n} = \lim_{n\to\infty} \frac{2n^2}{4n} = \lim_{n\to\infty} \frac{n}{2} = +\infty$

b) $\lim_{n\to\infty} \frac{n}{1-n} = \lim_{n\to\infty} \frac{n}{-n} = \lim_{n\to\infty} -1 = -1$

c) $\lim_{n\to\infty} \frac{3^n - 3^{n-1}}{2+3^n} = \lim_{n\to\infty} \frac{3^n\left(1-3^{-1}\right)}{3^n\left(\frac{2}{3^n}+1\right)} =$

$\lim_{n\to\infty} \frac{\frac{2}{3}}{\frac{2}{3^n}+1} = \frac{\frac{2}{3}}{1} = \frac{2}{3}$

d) $\lim_{n\to\infty} \left(\sqrt{n^2+n} - n\right) =$ conjugué

$\lim_{n\to\infty} \frac{\sqrt{n^2+n} - n}{1} \cdot \frac{\sqrt{n^2+n} + n}{\sqrt{n^2+n} + n} =$

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d) (Suite) $\lim_{n\to\infty} \left(\sqrt{n^2+n} - n\right) =$

$$\lim_{n\to\infty} \frac{n^2+n-n^2}{\sqrt{n^2+n}+n} =$$

$$\lim_{n\to\infty} \frac{\not{n}}{\not{n}\left(\sqrt{1+\frac{1}{n}}+1\right)} = \lim_{n\to\infty} \frac{1}{\sqrt{1+\frac{1}{n}}+1}$$

$$= \frac{1}{2}$$

e) $\lim_{n\to\infty} \dfrac{n^2(n-1)+2n+n^2-n^3}{n-1} =$

$$\lim_{n\to\infty} \frac{\cancel{n^3}-\cancel{n^2}+2n+\cancel{n^2}-\cancel{n^3}}{n-1} =$$

$$\lim_{n\to\infty} \frac{2n}{n-1} = \lim_{n\to\infty} \frac{2n}{n} = 2$$

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f) $\lim_{n\to\infty} \frac{1+2+\dots+n}{n^2} =$

$\lim_{n\to\infty} \frac{n \cdot \frac{n+1}{2}}{n^2} = \lim_{n\to\infty} \frac{1}{2} \cdot \frac{n^2+n}{n^2} =$

$\lim_{n\to\infty} \frac{1}{2} \cdot \frac{n^2}{n^2} = \lim_{n\to\infty} \frac{1}{2} = \frac{1}{2}$