NOM :

INTERRO DE COURS – SEMAINE 17

Exercice 1 – Calculer les limites suivantes.

1. $\lim\limits_{x\to -1} x^2-5x+6$

Solution :

$$\lim_{x\to -1} x^2-5x+6 = (-1)^2-5\times(-1)+6 = 1+5+6 = 12$$

2. $\lim\limits_{x\to 3} \dfrac{2x-1}{x+6}$

Solution :

$$\lim_{x\to 3} \frac{2x-1}{x+6} = \frac{2\times 3-1}{3+6} = \frac{5}{9}$$

3. $\lim\limits_{x\to 2^+} \dfrac{3x-1}{2x-4}$

Solution :

$$\left.\begin{array}{l}\lim\limits_{x\to 2^+} 3x-1 = 5\\ \lim\limits_{x\to 2^+} 2x-4 = 0^+\end{array}\right\} \text{Par quotient,} \quad \lim_{x\to 2^+} \frac{3x-1}{2x-4} = +\infty.$$

4. $\lim\limits_{x\to 1^-} \dfrac{2x+1}{-x+1}$

Solution :

$$\left.\begin{array}{l}\lim\limits_{x\to 1^-} 2x+1 = 3\\ \lim\limits_{x\to 1^-} -x+1 = 0^+\end{array}\right\} \text{Par quotient,} \quad \lim_{x\to 1^-} \frac{2x+1}{-x+1} = +\infty.$$

5. $\lim\limits_{x\to -\infty} 1+\dfrac{1}{x}+\dfrac{3}{x^3}$

Solution :

$$\left.\begin{array}{l}\lim\limits_{x\to -\infty} 1 = 1\\ \lim\limits_{x\to -\infty} \dfrac{1}{x} = 0^-\\ \lim\limits_{x\to -\infty} \dfrac{3}{x^3} = 0^-\end{array}\right\} \text{Par somme,} \quad \lim_{x\to -\infty} 1+\frac{1}{x}+\frac{3}{x^3} = 1.$$

6. $\lim\limits_{x\to -\infty} x^3-5x^2+4x-7$

Solution :

$$\lim_{x\to -\infty} x^3-5x^2+4x-7 = \lim_{x\to -\infty} x^3 = -\infty$$

7. $\lim\limits_{x\to+\infty} \dfrac{3x^2-2x+1}{-4x^3+2x-5}$

Solution :

$$\lim_{x\to+\infty} \frac{3x^2-2x+1}{-4x^3+2x-5} = \lim_{x\to+\infty} \frac{3x^2}{-4x^3} = \lim_{x\to+\infty} \frac{-3}{4x} = 0^-$$

8. $\lim\limits_{x\to-\infty} \left(2x^2+1\right) \times \dfrac{2x^2+3x-1}{x^2+5}$

Solution :

$$\lim_{x\to-\infty} 2x^2+1 = \lim_{x\to-\infty} 2x^2 = +\infty \quad \text{et} \quad \lim_{x\to-\infty} \frac{2x^2+3x-1}{x^2+5} = \lim_{x\to-\infty} \frac{2x^2}{x^2} = \lim_{x\to-\infty} 2 = 2$$

$$\left.\begin{array}{l} \lim\limits_{x\to-\infty} 2x^2+1 = +\infty \\ \lim\limits_{x\to-\infty} \dfrac{2x^2+3x-1}{x^2+5} = 2 \end{array}\right\} \text{Par produit, } \lim_{x\to-\infty} \left(2x^2+1\right) \times \frac{2x^2+3x-1}{x^2+5} = +\infty.$$

9. $\lim\limits_{x\to+\infty} \sqrt{\dfrac{2}{x^2}+4}$

Solution :

$$\lim_{x\to+\infty} \frac{2}{x^2} = 0^+ \implies \lim_{x\to+\infty} \frac{2}{x^2}+4 = 4 \implies \lim_{x\to+\infty} \sqrt{\frac{2}{x^2}+4} = \sqrt{4} = 2$$

10. $\lim\limits_{x\to2^+} \left(\sqrt{\dfrac{1}{x-2}}+3\right)^2$

Solution :

$$\lim_{x\to2^+} \frac{1}{x-2} = +\infty \implies \lim_{x\to2^+} \sqrt{\frac{1}{x-2}} = +\infty \implies \lim_{x\to2^+} \sqrt{\frac{1}{x-2}}+3 = +\infty$$

$$\implies \lim_{x\to2^+} \left(\sqrt{\frac{1}{x-2}}+3\right)^2 = +\infty$$