

Calculer $\lim_{x \rightarrow \pm\infty} \frac{\sqrt{4x^2 - 5x + 1} - 2x}{2x - 5}$.

On a

$$\begin{aligned} \blacksquare \quad \lim_{x \rightarrow +\infty} \frac{\sqrt{4x^2 - 5x + 1} - 2x}{2x - 5} &= \lim_{x \rightarrow +\infty} \frac{\sqrt{4x^2 - 5x + 1} - 2x}{2x - 5} \cdot \frac{\sqrt{4x^2 - 5x + 1} + 2x}{\sqrt{4x^2 - 5x + 1} + 2x} \\ &= \lim_{x \rightarrow +\infty} \frac{-5x + 1}{(2x - 5)(\sqrt{4x^2 - 5x + 1} + 2x)} \\ &= \lim_{x \rightarrow +\infty} \frac{-5x}{8x^2} \\ &= \boxed{0} \end{aligned}$$

$$\begin{aligned} \blacksquare \quad \lim_{x \rightarrow -\infty} \frac{\sqrt{4x^2 - 5x + 1} - 2x}{2x - 5} &= \lim_{x \rightarrow -\infty} \frac{-2x - 2x}{2x} \\ &= \lim_{x \rightarrow -\infty} \frac{-4x}{2x} \\ &= \boxed{-2} \end{aligned}$$