

[11.0102]

$$f(x) = 3x - 4x^3$$

$f$  est définie et continue sur  $\mathbb{R}$ .

$$f'(x) = 3 - 12x^2$$

$$f'(x) = 0 \Leftrightarrow 3 - 12x^2 = 0$$

$$\Leftrightarrow 3 = 12x^2$$

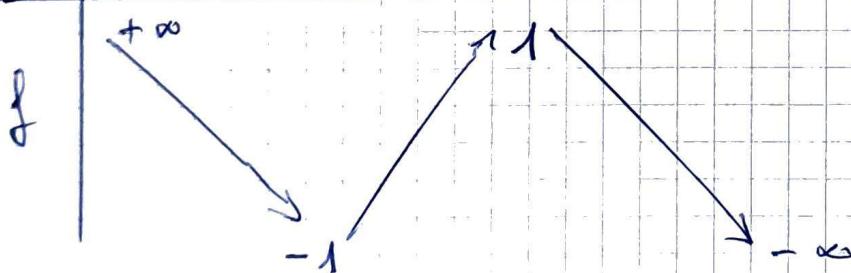
$$\Leftrightarrow x^2 = \frac{3}{12}$$

$$\Leftrightarrow x = +\sqrt{\frac{3}{12}} = +\sqrt{\frac{1}{4}} = \frac{1}{2}$$

$$x = -\sqrt{\frac{3}{12}} = -\sqrt{\frac{1}{4}} = -\frac{1}{2}$$

x	$-\infty$	$-\frac{1}{2}$	$\frac{1}{2}$	$+\infty$
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$f'$	-	+	0	-
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$$f(y) = 3x - 4x^3 = x^3 \left( \frac{3}{x^2} - 4 \right)$$

$$\lim_{x \rightarrow +\infty} \frac{3}{x^2} = \lim_{x \rightarrow -\infty} \frac{3}{x^2} = 0$$

$$\lim_{x \rightarrow +\infty} \left( \frac{3}{x^2} - 4 \right) = \lim_{x \rightarrow -\infty} \left( \frac{3}{x^2} - 4 \right) = -4$$

$$\text{donc } \lim_{x \rightarrow +\infty} f(x) = -\infty \quad \text{et} \quad \lim_{x \rightarrow -\infty} f(x) = +\infty$$

$$f'(0) = 3 > 0$$

$$f'(1) = 3 - 12 = -9 < 0$$

$$f'(-1) = 3 - 12 = -9 < 0$$

$$f\left(-\frac{1}{2}\right) = -\frac{3}{2} + \frac{4}{8}$$

$$= -\frac{3}{2} + \frac{1}{2}$$

$$= -1$$

$$f\left(\frac{1}{2}\right) = \frac{3}{2} - \frac{4}{8}$$

$$= \frac{3}{2} - \frac{1}{2}$$

$$= 1$$