I. Le nombre dérivé

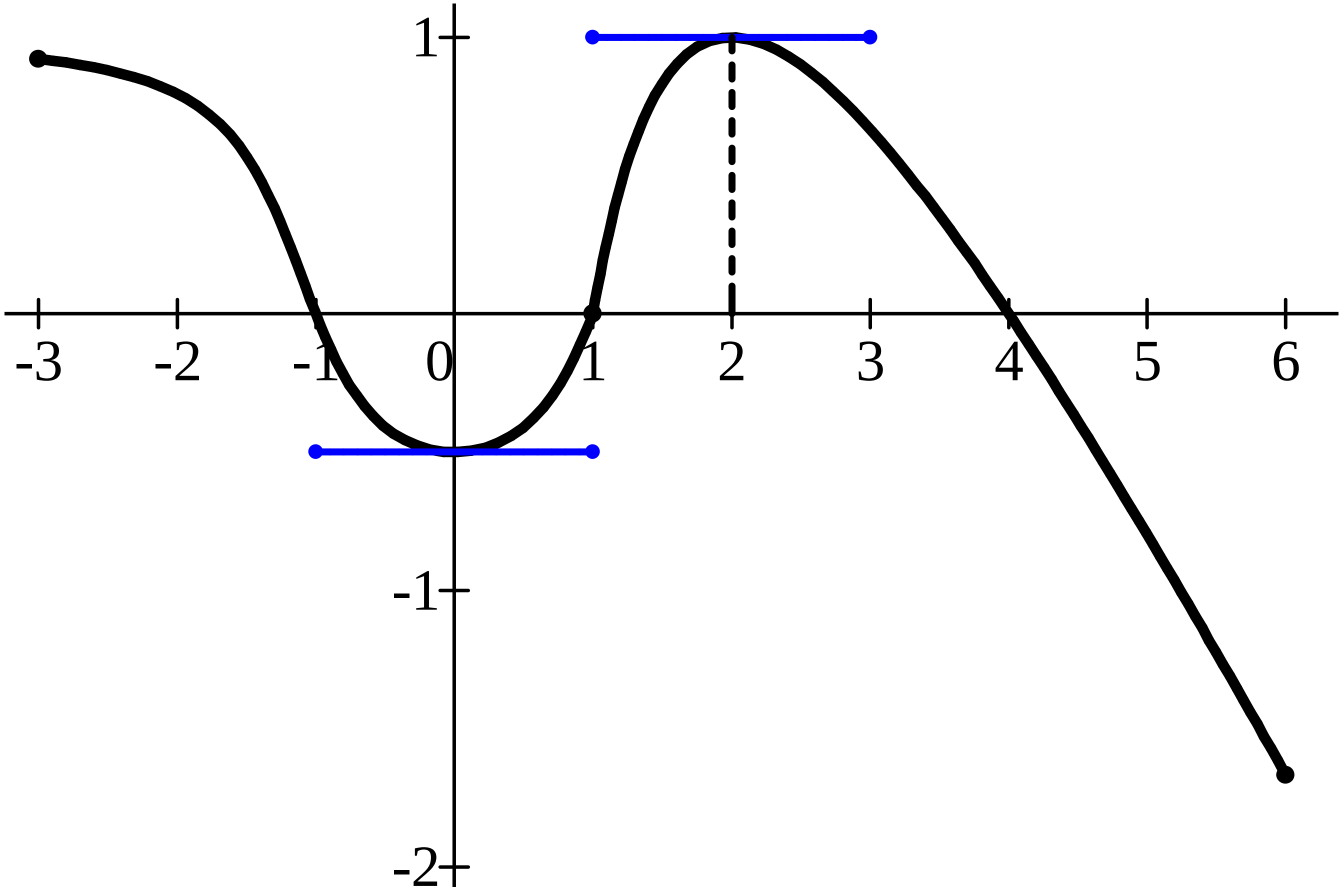
Déterminer graphiquement :

a) $f(2)$ et $f'(2)$

b) $f(0)$ et $f'(0)$

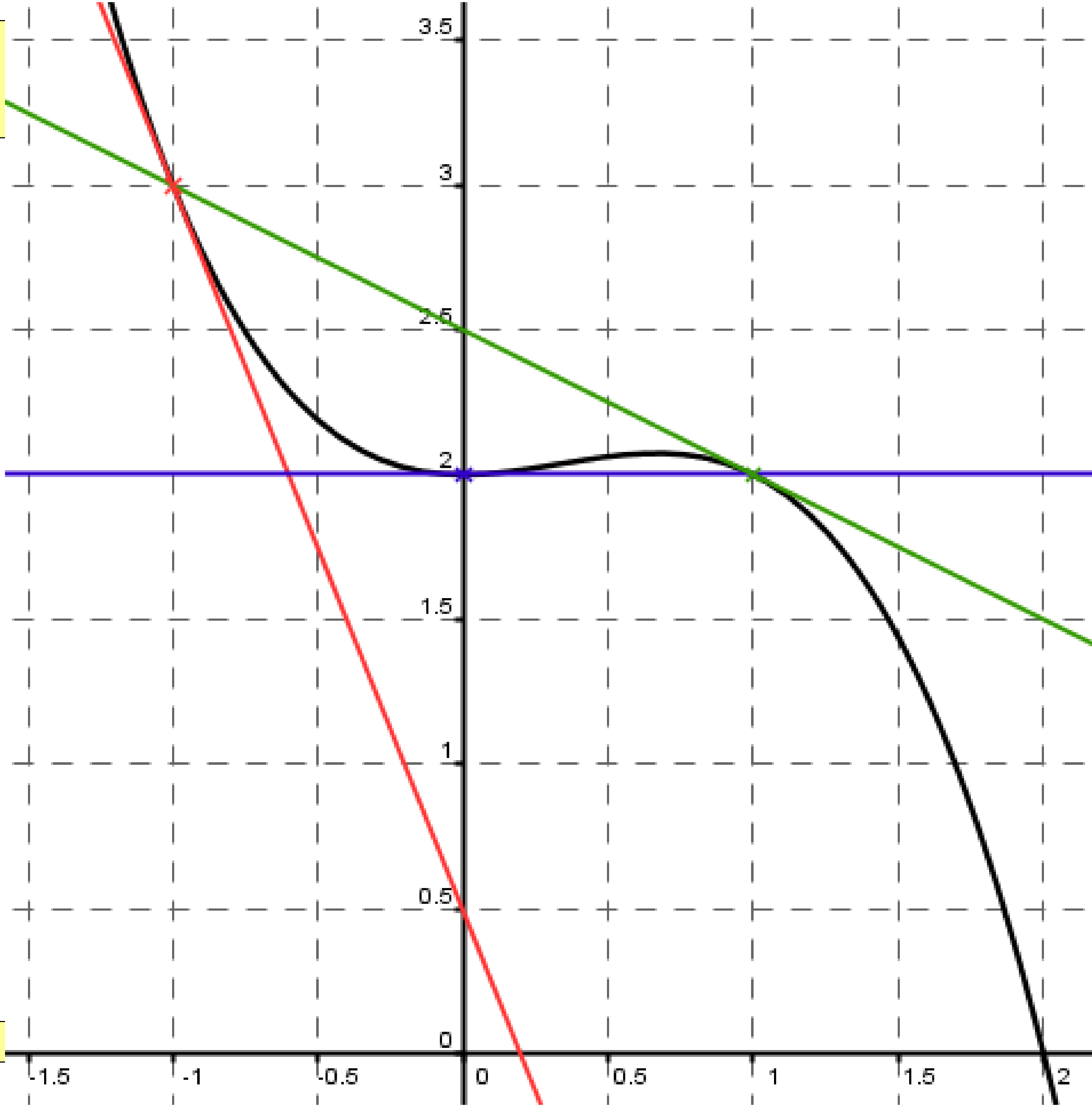
c) les solutions de l'équation $f(x) = 0$

d) les solutions de l'inéquation $f'(x) \leq 0$



Déterminer graphiquement :

$f(-1)$,
$f(0)$
et $f(1)$
$f'(-1)$,
$f'(0)$
et $f'(1)$



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II. Règles de dérivation des fonctions

▶ 1. La dérivée d'une constante est nulle.

$f(x) = 5$ donc $f'(x) = \cdots$

▶ 2. Pour tout $n \in \mathbb{N}^*$ $\quad (x^n)' = nx^{n-1}$

$g(x) = x$ donc $g'(x) = \cdots$

$h(x) = x^3$ donc $h'(x) = \cdots$

▶ 3. $(u+v)' = u' + v'$

$$f(x) = x^3 + x^2 + x \qquad f'(x) = \cdots$$

$$g(x) = x^7 + x^4 - 3 \qquad g'(x) = \cdots$$

▶ 4. $(ku)' = k \times u'$

$$h(x) = 4x^6 - 5x^4 \qquad h'(x) = \cdots$$

$$k(x) = 5x^3 - 3x^2 + 2x - 3 \qquad k'(x) = \cdots$$

▶ **5.** $\left(\sqrt{x}\right)' = \dfrac{1}{2\sqrt{x}}$

$$f(x) = 4\sqrt{x} + 2 \qquad f'(x) = \cdots$$

$$g(x) = 2x^2 - 6\sqrt{x} \qquad g'(x) = \cdots$$

▶ 6. $(\sin x)' = \cos x$ et $(\cos x)' = -\sin x$

$$h(x) = 3\sin x \qquad h'(x) = \cdots$$

$$k(x) = 5\cos x - 2 \qquad k'(x) = \cdots$$

▶ 7. $(u \times v)' = u' \times v + u \times v'$

$$f(x) = x^2 \times (3x+4) \qquad f'(x) = \cdots$$

$$g(x) = (x^2+1) \times \sin x \qquad g'(x) = \cdots$$

▶ 8. $\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}$

$$h(x) = \frac{1}{x} \qquad h'(x) = \cdots$$

$$k(x) = \frac{2x-1}{x^2+2} \qquad k'(x) = \cdots$$

$$l(x) = \frac{4x+1}{3x-2} \qquad l'(x) = \cdots$$

▶ 9. $(u^n)' = n \times u^{n-1} \times u'$

$$f(x) = (5x+1)^3 \qquad f'(x) = \cdots$$

$$g(x) = (3-4x)^7 \qquad g'(x) = \cdots$$

$$h(x) = \left(\sqrt{x}\right)^5 \qquad h'(x) = \cdots$$

$$i(x) = \sin^2 x \qquad i'(x) = \cdots$$

▶10. $\left(\sin(u)\right)' = \cos(u) \times u'$ et $\left(\cos(u)\right)' = -\sin(u) \times u'$

$$f(x) = \sin(2x+3) \qquad f'(x) = \cdots$$

$$g(x) = 5\cos(6-4x) \qquad g'(x) = \cdots$$

$$h(x) = \sin^2(2x) \qquad h'(x) = \cdots$$

▶11. $\left(\sqrt{u}\right)' = \dfrac{u'}{2\sqrt{u}}$

$$i(x) = \sqrt{5x^2+1} \qquad i'(x) = \cdots$$