

## Séance 4

### exercice 1 :

$$f(x) = x^2 + 2x, \quad a = 2$$

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$$f(2) = 8$$

$$f'(x) = 2x + 2$$

$$f'(2) = 6$$

$$y = f'(2)(x-2) + f(2)$$

$$= 6(x-2) + 8$$

$$= 6x - 12 + 8 = 6x - 4$$

donc une équation de la tangente à la courbe  $g$  au point d'abscisse 2 est  $y = 6x - 4$ .

exercice 2 :

$$g(x) = \frac{1}{x}, \quad a = 1$$

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$$g(1) = 1 \quad g'(x) = -\frac{1}{x^2}$$

$$g'(1) = -1$$

$$y = g'(1)(x - 1) + g(1)$$

$$= -(x - 1) + 1$$

$$= -x + 2$$

### exercice 3 :

$$h(x) = x^3 - x, \quad a = -1$$

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$$h(-1) = 0$$

$$h'(x) = 3x^2 - 1$$

$$h'(-1) = 2$$

$$y = h'(-1)(x + 1) + h(-1)$$

$$= 2(x + 1) + 0$$

$$= 2x + 2$$

### exercice 4 :

$$K(x) = (2x + 1)(x - 3)$$

$$a = 0$$

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$$K(0) = -3$$

$$\begin{aligned} K'(x) &= 2(x-3) + 2x + 1 \\ &= 4x - 5 \end{aligned}$$

$$K'(0) = -5$$

$$y = -5x - 3$$

# Séance 5

$$f(a+h) \approx f(a) + h \times f'(a)$$

exercice 1:

$$f(x) = x^2, \quad f(5, 1).$$

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$$\begin{aligned} f(5, 1) &= f(\overset{a}{\underset{\swarrow}{5}} + \overset{h}{\underset{\swarrow}{0,1}}, 1) \\ &\approx f(5) + 0,1 \times f'(5) \end{aligned}$$

$$f(5) = 5^2 = 25$$

$$f'(x) = 2x \quad / \quad f'(5) = 10$$

$$\text{done } f(5, 1) \approx 25 + 0,1 \times 10 = 26$$

exercice 2:

$$g(x) = \frac{1}{x}, \quad g(10, 2)$$

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$$g(10, 2) = g(10 + 0, 2)$$

$$\approx g(10) + 0,2 \times g'(10)$$

$$\approx \frac{1}{10} + 0,2 \times -\frac{1}{100}$$

$$\approx \frac{1}{10} - \frac{2}{1000}$$

$$\approx \frac{98}{1000}$$

$$\approx 0,098$$

### exercice 3 :

$$C(x) = 0,02x^2 + 40x + 100$$

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$$C(101) = C(100 + 1)$$

$$\approx C(100) + 1 \times C'(100)$$

$$C(100) = 200 + 4000 + 100$$

$$= 5200$$

$$C'(x) = 0,04x + 40$$

$$C'(100) = 4 + 40 = 44$$

$$C(101) \approx 5200 + 44 = 5244$$

#### exercice 4 :

$$h(x) = \sqrt{x}, \quad \sqrt{99}$$

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$$h(99) = h(100 - 1)$$

$$\approx h(100) - 1 \times h'(100)$$

$$h(100) = \sqrt{100} = 10$$

$$h'(x) = \frac{1}{2\sqrt{x}}$$

$$h'(100) = \frac{1}{20}$$

$$\begin{aligned} h(99) &\approx 10 - \frac{1}{20} = \frac{199}{20} \\ &= 9,95. \end{aligned}$$

## Séance 6

### exercice 1:

$$f(x) = 5x^3 - 2x^2 + 4x - 7$$

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$$f'(x) = 15x^2 - 4x + 4$$

### exercice 2:

$$g(x) = 3\sqrt{x} + \frac{2}{x} - x^2$$

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$$g'(x) = \frac{3}{2\sqrt{x}} - \frac{2}{x^2} - 2x$$

### exercice 3:

$$h(x) = (2x+3)(x^2-1)$$

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$$\begin{aligned} h'(x) &= 2(x^2-1) + 2x(2x+3) \\ &= 2x^2 - 2 + 4x^2 + 6x \\ &= 6x^2 + 6x - 2. \end{aligned}$$

### exercice 4:

$$k(x) = \frac{x-1}{x+1}$$

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

$$= \frac{2}{(x+1)^2} > 0$$

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Séance 7

exercice 1:

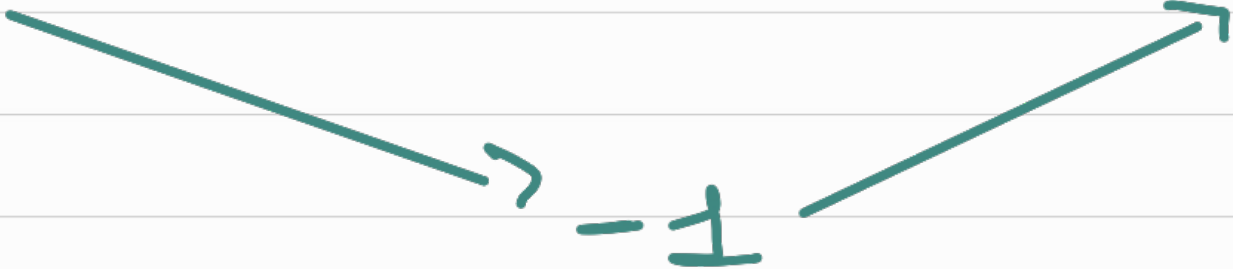
$$f(x) = x^2 - 4x + 3$$

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$$f'(x) = 2x - 4$$

$$f'(x) = 0 \Leftrightarrow 2x - 4 = 0$$

$$\Leftrightarrow x = 2$$

|      |                                                                                     |            |           |
|------|-------------------------------------------------------------------------------------|------------|-----------|
| $x$  | $-\infty$                                                                           | $2$        | $+\infty$ |
| $f'$ | $-$                                                                                 | $\bigcirc$ | $+$       |
| $f$  |  |            |           |

$$f(2) = 2^2 - 4 \times 2 + 3$$

$$= -1$$

donc  $f$  admet un minimum  
local en  $x = 2$ .