

### Correction interno 3

#### exo 1

1.

|         |    |    |    |   |
|---------|----|----|----|---|
| $x$     | -3 | -1 | 3  | 8 |
| $f(x)$  | 1  | 2  | -2 | 1 |
| $f'(x)$ | 2  | 0  | -1 | 4 |

2.

$$y = f'(3)(x-3) + f(3)$$

$$y = -(x-3) - 2$$

$$y = -x + 1$$

#### exo 2

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

$$y = -\frac{1}{2}(x+2) - 1$$

$$y = -\frac{1}{2}x - 1 - 1$$

$$y = -\frac{1}{2}x - 2$$

#### exo 3

1.

$$\frac{f(4+h) - f(4)}{h} = \frac{(4+h)^2 - 3(4+h) + 2 - (4^2 - 3 \times 4 + 2)}{h}$$

$$= \frac{16 + 8h + h^2 - 12 - 3h + 2 - 16 + 12 - 2}{h}$$

$$= \frac{h^2 + 5h}{h}$$

$$= \frac{h(h+5)}{h} = h+5$$

$\lim_{h \rightarrow 0} (h+5) = 5$   
 donc  $f$  est dérivable en 4  
 et  $f'(4) = 5$ .

2.

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

$$= 16 - 12 + 2$$

$$= 6$$

$$f'(4) = 5$$

$$y = f'(4)(x-4) + f(4)$$

$$y = 5(x-4) + 6$$

$$y = 5x - 14$$

#### exo 4

1.

$$\frac{f(s+h) - f(s)}{h} = \frac{\sqrt{3(s+h)+1} - \sqrt{3s+1}}{h}$$

$$= \frac{\sqrt{15+3h+1} - \sqrt{15+1}}{h}$$

$$= \frac{\sqrt{3h+16} - \sqrt{16}}{h}$$

$$= \frac{\sqrt{3h+16} - 4}{h}$$

2.

$$\frac{\sqrt{3h+16} - 4}{h} = \frac{(\sqrt{3h+16} - 4)(\sqrt{3h+16} + 4)}{h(\sqrt{3h+16} + 4)}$$

$$= \frac{(\sqrt{3h+16})^2 - 4^2}{h(\sqrt{3h+16} + 4)}$$

$$= \frac{3h+16-16}{h(\sqrt{3h+16} + 4)}$$

$$= \frac{3h}{h(\sqrt{3h+16} + 4)}$$

$$= \frac{3}{\sqrt{3h+16} + 4}$$

$$3. \lim_{h \rightarrow 0} \frac{3}{\sqrt{3h+16}+4} = \frac{3}{\sqrt{3 \cdot 0 + 16} + 4} = \frac{3}{4+4} = \frac{3}{8}$$

Donc  $f$  est dérivable en  $s$  et  $f'(s) = \frac{3}{8}$

exos

$$\begin{aligned} 1. \frac{f(a+h) - f(a)}{h} &= \frac{\frac{1}{a+h} - \frac{1}{a}}{h} \\ &= \frac{\frac{a}{(a+h)a} - \frac{a+h}{(a+h)a}}{h} \\ &= \frac{\frac{a-a-h}{a(a+h)}}{h} \\ &= \frac{\frac{-h}{a(a+h)}}{h} \\ &= \frac{-h}{a(a+h)} \times \frac{1}{h} \\ &= \frac{-1}{a(a+h)} \end{aligned}$$

$$\lim_{h \rightarrow 0} \frac{-1}{a(a+h)} = \frac{-1}{a^2} \quad \text{Donc } f \text{ dérivable en } a \text{ et } f'(a) = -\frac{1}{a^2}.$$

$$2. f'(1) = \frac{-1}{1^2} = -1$$

$$f'\left(\frac{2}{3}\right) = \frac{-1}{\left(\frac{2}{3}\right)^2} = \frac{-1}{\frac{4}{9}} = -\frac{9}{4}$$

$$3. y = f'\left(\frac{2}{3}\right)\left(x - \frac{2}{3}\right) + f\left(\frac{2}{3}\right)$$

$$f'\left(\frac{2}{3}\right) = -\frac{9}{4} \quad f\left(\frac{2}{3}\right) = \frac{3}{2}$$

$$y = -\frac{9}{4}\left(x - \frac{2}{3}\right) + \frac{3}{2}$$

$$y = -\frac{9}{4}x + \frac{18}{12} + \frac{3}{2}$$

$$y = -\frac{9}{4}x + \frac{36}{12}$$

$$y = -\frac{9}{4}x + 3$$