

2.2.7

$$f(x) = 2x$$

$$g(x) = 2x - 1$$

$$h(x) = x^2$$

$$\begin{aligned} \text{a) } (f \circ g)(x) &= f(g(x)) = f(2x - 1) \\ &= 2(2x - 1) = 4x - 2 \end{aligned}$$

$$\begin{aligned} \text{b) } (h \circ f)(x) &= h(f(x)) = h(2x) \\ &= (2x)^2 = 4x^2 \end{aligned}$$

Ex 2.2.7

$$f(x) = 2x, g(x) = 2x - 1 \text{ et } h(x) = x^2$$

$$(g \circ f)(x) = g(f(x))$$

$$\begin{aligned} \text{c) } (g \circ h \circ f)(x) &= g(h(f(x))) \\ &= g(h(2x)) = g((2x)^2) \\ &= g(4x^2) \\ &= 2(4x^2) - 1 = 8x^2 - 1 \end{aligned}$$

$$g(\underbrace{\quad}_{\text{L}}) = 2(\underbrace{\quad}_{\text{L}}) - 1$$

$$\underbrace{2(2x-1)^2}_{(h \circ g)(x)} \\ \underbrace{\quad}_{(f \circ h \circ g)(x)}$$

Ex 2.2.8

$$a) \quad f(x) = x^2 - 3x \quad g(x) = \sqrt{x+2}$$

$$(f \circ g)(x) = f(g(x)) = f(\sqrt{x+2}) = \sqrt{x+2}^2 - 3\sqrt{x+2} = x+2 - 3\sqrt{x+2}$$
$$f(\hat{u}) = \hat{u}^2 - 3\hat{u}$$

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

2.2.9 Les fonctions f suivantes sont des fonctions composées. Donner une décomposition possible de f en deux fonctions : $f = g \circ h$.

a) $f(x) = \sqrt{3x+1}$

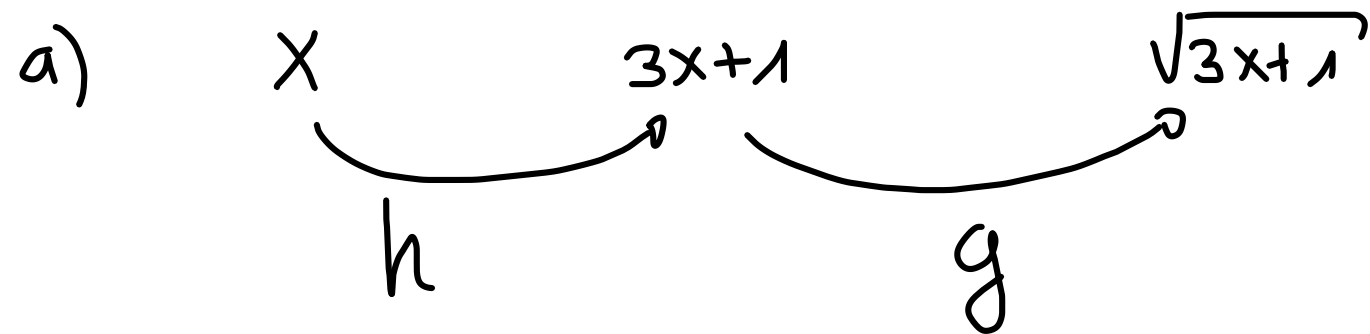
b) $f(x) = \frac{1}{x^2+x+3}$

c) $f(x) = (x+2)^7$

d) $f(x) = \frac{\sqrt{x}+2}{\sqrt{x}-4}$

e) $f(x) = \log(x^2+4)$

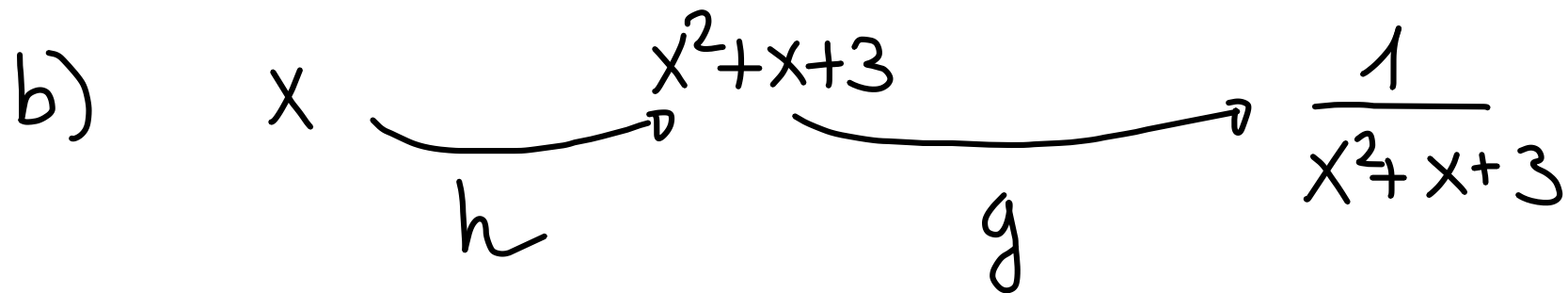
f) $f(x) = 3^{2x-5}$



$$h(x) = 3x+1$$

$$g(x) = \sqrt{x}$$

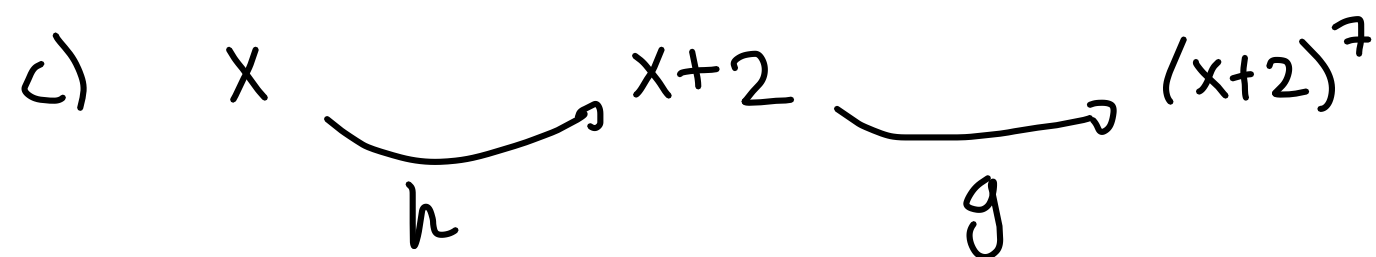
$$\Rightarrow (g \circ h)(x) = f(x)$$



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

$$g(x) = \frac{1}{x}$$

$$(g \circ h)(x) = f(x)$$



$$h(x) = x+2$$

$$g(x) = x^7$$

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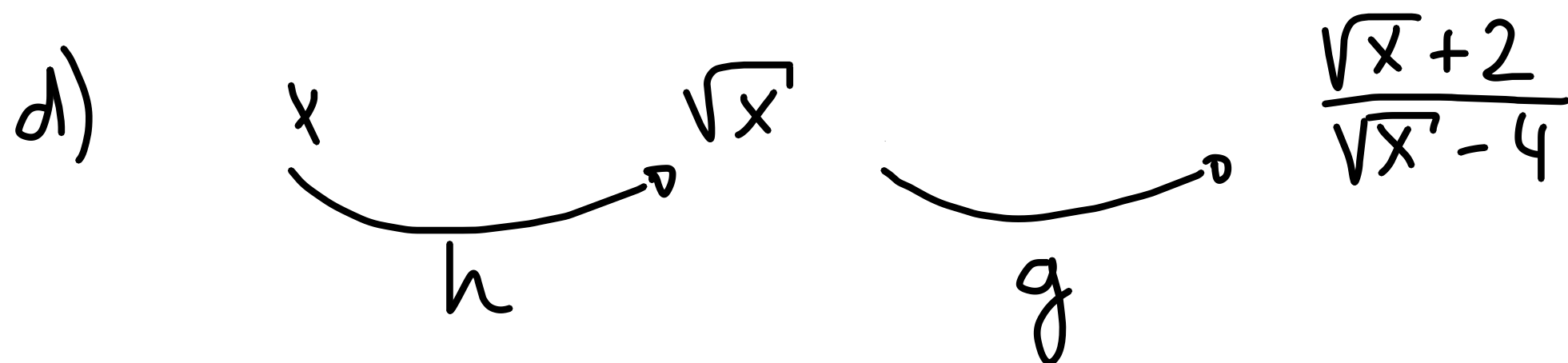
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e) $f(x) = \log(x^2+4)$

f) $f(x) = 3^{2x-5}$



$$h(x) = \sqrt{x}$$

$$g(x) = \frac{x+2}{x-4}$$

Exercise

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

$$g(x) = x^2 + 1$$

Calculate

a) $f + g$

b) $f - g$

c) $f \cdot g$

d) $\frac{g}{f}$

e) $f \circ g$

f) $g \circ f$

g) $f \circ f$

h) $g \circ g$