Calculer les dérivées des fonctions suivantes :

a) $f(x) = x^2.\cos x$

$f = uv \implies f' = u'v + uv'$ avec $\begin{cases} u = x^2 \implies u' = 2x \\ v = \cos x \implies v' = \text{-}\sin x \end{cases}$.

$f'(x) = 2x.\cos x - x^2.\sin x = x(2\cos x - x.\sin x)$.

b) $g(x) = x.\sin^2 x$

$g = uv \implies g' = u'v + uv'$ avec $\begin{cases} u = x \implies u' = 1 \\ v = (\sin x)^2 \implies v' = 2\sin x(\sin x)' = 2\sin x.\cos x \end{cases}$.

$g'(x) = \sin^2 x + 2x.\sin x.\cos x = \sin x(\sin x + 2x.\cos x)$.

c) $h(x) = (x.\tan x)^2$

$h = U^2 \implies h' = 2UU'$ et $U = uv$ avec $\begin{cases} u = x \implies u' = 1 \\ v = \tan x \implies v' = 1 + \tan^2 x = \dfrac{1}{\cos^2 x} \end{cases}$.

$h'(x) = 2x.\tan x(x.\tan x)' = 2x.\tan x[1.\tan x + x(1 + \tan^2 x)] = 2x.\tan x(x + x.\tan^2 x + \tan x)$.