Méthodes de dérivation

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a) $$\left[\frac{(x^2+4)^2}{x^2-8}\right]' = \frac{2(x^2+4).2x.(x^2-8)-(x^2+4)^2.2x}{(x^2-8)^2}$$

$$= \frac{2x.(x^2+4).\left[2.(x^2-8)-(x^2+4)\right]}{(x^2-8)^2}$$

$$= \frac{2x.(x^2+4).(2x^2-16-x^2-4)}{(x^2-8)^2}$$

$$= \frac{2x(x^2+4).(x^2-20)}{(x^2-8)^2}$$

b) $$\left(\frac{x^3}{2-x}\right)' = \frac{3x^2(2-x)-x^3.(-1)}{(2-x)^2} = \frac{\overbrace{6x^2-3x^3+x^3}^{6x^2-2x^3}}{(2-x)^2} = \frac{2x^2(3-x)}{(2-x)^2}$$

c) $$\left(\frac{9+x^2}{9-x^2}\right)' = \frac{2x(9-x^2)-(9+x^2).(-2x)}{(9-x^2)^2}$$

$$= \frac{18x-2x^3+18x+2x^3}{(9-x^2)^2} = \frac{36x}{(9-x^2)^2}$$

d) $$\left[\frac{(x-1)^2}{2+x^2}\right]' = \frac{2(x-1).(2+x^2)-(x-1)^2.2x}{(2+x^2)^2}$$

$$= \frac{2(x-1).\left[(2+x^2)-(x-1).x\right]}{(2+x^2)^2}$$

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

e) $$\left[\frac{2t^4}{(9-t^2)^2}\right]' = \frac{8t^3.(9-t^2)^2-2t^4.2(9-t^2).(-2t)}{(9-t^2)^4}$$

$$= \frac{8t^3\cancel{(9-t^2)}.\left[(9-t^2)+t^2\right]}{(9-t^2)^{\cancel{4}\,3}}$$

$$= \frac{8t^3.9}{(9-t^2)^3} = \frac{72t^3}{(9-t^2)^3}.$$

f) $$\left(\frac{2x^2+3x-17}{x+5}\right)' = \frac{(4x+3).(x+5)-(2x^2+3x-17).1}{(x+5)^2}$$

$$= \frac{4x^2+20x+3x+15-2x^2-3x+17}{(x+5)^2}$$

$$= \frac{2x^2+20x+32}{(x+5)^2} = \frac{2(x^2+10x+16)}{(x+5)^2}$$