Classe: TS1ET	Date: 3/12/2012	**Type**
Devoir n°3		**Interrogation**
Thème: Calcul de dérivées		

Calculer les dérivées des fonctions données :

1°) $f(x)=3x^2-2x+7$

2°) $f(x)=\frac{3}{4}x^4+7x^2-2x+\sqrt{2}$

3°) $f(x)=\frac{1}{2x+1}$

4°) $f(x)=\frac{4}{x}-x$

5°) $f(x)=\frac{4}{3x+4}-\frac{1}{x}$

6°) $f(x)=\frac{4x-1}{2x+3}$

7°) $f(x)=\frac{(x^2+x+2)}{(x^2+1)}$

8°) $f(x)=(2x-1)^4$

9°) $f(x)=\cos(5x+3)$

10°) $f(x)=\frac{\cos(3x)}{\sin(2x)}$

Corrigé du devoir.

1°) $f(x) = 3x^2 - 2x + 7$

$f'(x) = 6x - 2$

2°) $f(x) = \frac{3}{4}x^4 + 7x^2 - 2x + \sqrt{2}$

$f'(x) = \frac{3}{4} \times 4x^3 + 7 \times 2x - 2 = 3x^3 + 14x - 2$

3°) $f(x) = \frac{1}{2x+1} = \frac{1}{u}$ avec $\begin{cases} u = 2x+1 \\ u' = 2 \end{cases}$

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

4°) $f(x) = \frac{4}{x} - x = 4 \times \left(\frac{1}{x}\right) - x$

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

5°) $f(x) = \frac{4}{3x+4} - \frac{1}{x} = 4 \times \left(\frac{1}{u}\right) - \frac{1}{x}$ avec $\begin{cases} u = 3x+4 \\ u' = 3 \end{cases}$

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

$f'(x) = -\frac{12}{(3x+4)^2} + \frac{1}{x^2}$

6°) $f(x) = \frac{4x-1}{2x+3} = \frac{u}{v}$

$f'(x) = \frac{u'v - uv'}{v^2} = \frac{4(2x+3) - (4x-1) \times 2}{(2x+3)^2}$

$f'(x) = \frac{8x + 12 - 8x + 2}{(2x+3)^2} = \frac{14}{(2x+3)^2}$

7°) $f(x) = \dfrac{x^2+x+2}{x^2+1} = \dfrac{u}{v}$

$$f'(x) = \frac{u'v - uv'}{v^2} = \frac{(2x+1)(x^2+1) - (x^2+x+2)\times 2x}{(x^2+1)^2}$$

$$f'(x) = \frac{2x^3+2x+x^2+1-(2x^3+2x^2+4x)}{(x^2+1)^2}$$

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

8°) $f(x) = (2x-1)^4 = u^4$

$$f'(x) = 4u^3 \times u' = 4(2x-1)^3 \times 2 = 8(2x-1)^3$$

9°) $f(x) = \cos(5x+3)$

$$f'(x) = -5\sin(5x+3)$$

10) $f(x) = \dfrac{\cos(3x)}{\sin(2x)} = \dfrac{u}{v}$ avec $u = \cos(3x) \quad u' = -3\sin(3x)$
$v = \sin(2x) \quad v' = 2\cos(2x)$

$$f'(x) = \frac{u'v - uv'}{v^2} = \frac{-3\sin(3x).\sin(2x) - 2\cos(3x)\cos(2x)}{\sin^2(2x)}$$