Bsc Software Design (Game/Web Dev.) Year 1
Mathematics 1
Tutorial #3

Product Rule, Quotient Rule and Chain Rule

Differentiate each of the following compound functions w.r.t. the stated variable using either the product rule, quotient rule or chain rule or combinations thereof and the identities contained within your maths tables:

1. $f(x)=x^3\cos(x)e^x$
2. $f(y)=e^{-y}\tan(5y)$
3. $f(x)=\dfrac{x^7-1}{x^6+x^5+x^4+x^3+x^2+x^1+1}$
4. $f(w)=\cos^2(w)\sec^2(w)$
5. $f(u)=\dfrac{\sin(u)}{\cos^2(u)+\sin^2(u)}$
6. $f(x)=e^{\ln|2\cos(x)\tan(3x)|}$
7. $f(x)=\dfrac{\cos^2(x)-\sin^2(x)}{\cos(2x)}$
8.* $f(y)=e^{4^y}$
9.* $f(x)=\sin^{-1}(3x)$
10.* $f(\xi)=e^{-b\xi}\sin(a\xi)$
11.* $f(u)=\dfrac{\cos(u)}{\sin(u)}$
12.* $f(x)=e^{u(x)}$

RELEVANT FORMULAE

$$x^2-y^2=(x-y)(x+y)$$
$$x^3-y^3=(x-y)(x^2+xy+y^2)$$
$$x^4-y^4=(x-y)(x^3+x^2y+xy^2+y^3)$$
$$\vdots$$
$$x^n-y^n=(x-y)(x^{n-1}+x^{n-2}y+\cdots+xy^{n-2}+y^{n-1})$$