$$sin(x) = sin(x) + \frac{cos(x)\cdot(-1)}{1!}\cdot(x-x_0)^1 + \frac{sin(x)\cdot(-1)\cdot(-1)}{2!}\cdot(x-x_0)^2 + \frac{cos(x)\cdot(-1)\cdot(-1)}{3!}\cdot (x-x_0)^3 + o(x-x_0)^3$$