習題集 3

(對應 張旭微積分 微分篇重點三:微分合成律 (連鎖律))

In question 1~5, find the given derivatives.

1. $(2^{2x^2+1})'$

2. $[\sin(66x+77)]'$

3. $(\sin^2 x \cdot \cos 3x)'$

4. $[\sin^2(x^2-2x+5)]'$

5. $[\ln(\cos x)]'$.

6. Find y' if $y = 2^{3^{4^x}}$.

7. Find $f'(x)$ if $f(x) = x\sin(\frac{1}{x})$.

8. Find $f'(x)$ if $f(x) = \begin{cases} \sin(x^2) & \text{if } x \geq 0 \\ -\sin(x^2) & \text{if } x < 0 \end{cases}$

9. Show that for any $x \neq 0$, we always have $\left[\ln|x|\right]' = \dfrac{1}{x}$.

10. Let $f(x) = x^r$ for $x > 0$. Here $r \in \mathbb{R}$ is a given real number. Show that $f'(x) = rx^{r-1}$.