MATH153 - Homework 5
due date: April 12 at 12.30

1. Suppose that $h(2x) = f(x^3 + g(x))$, where $f(0) = 5, f'(0) = 4, g(-2) = 3, g(-1) = 1, g'(-1) = 2$. Find $h'(-2)$

2. Let f be a function defined on $[0,8]$ and f', f'' exist on $(0,8)$. If $f(1) = -2, f(3) = 5, f(4) = 6, f(8) = 20$, then show that there is a number $c \in (0,8)$ such that $f''(c) = 0$

3. Find equation of tangent and normal lines drawn to the curve implicitly defined by $x + tan(\frac{y}{x}) = 2$ at the point $P = (1, \frac{\pi}{4})$

4. Use the Mean Value Theorem to prove that for $x > 1$;

$$\frac{x-1}{x} < f(x) < x - 1$$

where $f'(x) = \frac{1}{x}$ for all $x > 1$ and $f(1) = 0$.