This page contains short answer questions. No explanations are required.

1. (12 points) .

(a) Compute the 25th derivative, $f^{(25)}$, of the function f given by

(i) $f(x) = 10x^9 + 14x^7 - 12x^6 + 2x^5 + 3x^4 - 2x^2 + 5x - 4$

$f^{(25)}(x) =$ 0

(ii) $f(x) = \sin(2x)$

$f^{(25)}(x) =$ $2^{25}\cos(2x)$

(b) For what value of a is $\lim_{h\to 0}(a^h - 1)/h$ equal to 1?

$a =$ e

(c) For the function $f(x) = (1.2)^{3x}$, find

(i) $f'(2/3) =$ $3\ln(1.2)(1.2)^2$ $(\approx .78762\ldots)$

(ii) $[f(2/3)]' =$ 0

2. (8 pts) The function f is an increasing function that is concave down. Fill in each of the blanks with one of the symbols, $<$, $=$, $>$ so that the following statments about f are always true.

(i) $f(2)$ $<$ $f(4)$

(ii) $f'(2)$ $>$ $f'(4)$

(iii) $f''(2)$ $<$ 0

(iv) $f(3 + \Delta x)$ $<$ $f(3) + f'(3)\Delta x$