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#88. $f(g(x)) = x \Rightarrow f'(g(x))\,g'(x) = 1 \Rightarrow g'(x) = \dfrac{1}{f'(g(x))}$

since $f'(x) = 1 + (f(x))^2$, $g'(x) = \dfrac{1}{1 + (f(g(x)))^2} = \dfrac{1}{1+x^2}$

$\because f(g(x)) = x$

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#4 AM at e,

Am at t,

LM at c, e, and s

Lm at b, c, d, and r

neither a max nor a min at a.

#46. $f(x) = x^3 - 3x + 1$, $[0,3]$ $\quad f'(x) = 3x^2 - 3 = 3(x+1)(x-1) = 0$

$\therefore x = \pm 1$

$f(0) = 1$ $\qquad f(-1) = -1 + 3 + 1 = 3$

$f(3) = 3^3 - 3^2 + 1 = 19$ $\qquad f(1) = 1 - 3 + 1 = -1$

$\therefore$ AM value is 19 at $x = 3$

Am value is -1 at $x = -1$

#52. $f(x) = \dfrac{x^2-4}{x^2+4}$, $[-4,4]$

$f'(x) = \dfrac{2x\cdot(x^2+4) - (x^2-4)\cdot 2x}{(x^2+4)^2}$

$= \dfrac{2x\cdot 8}{(x^2+4)^2} = 0$

$\therefore x = 0$

$f(-4) = \dfrac{16-4}{16+4} = \dfrac{12}{20} = \dfrac{3}{5}$

$f(0) = -1$

$f(4) = \dfrac{3}{5}$

$\therefore$ AM value is $\frac{3}{5}$ at $x = \pm 4$

Am value is -1 at $x = 0$

#69. $f(x) = x^{101} + x^{51} + x + 1$

$f'(x) = 101\cdot x^{100} + 51\cdot x^{50} + 1 \geqslant 1$, for all x.

So $f'(x) = 0$ has no solution i.e. $f(x)$ has neither a LM nor a Lm.