

① a) yes b) no c) yes d) yes

② a) $\cos(\cos^2 x) \sin x$ b) $\frac{2(1-(2x)^2)}{(2x)^2+1} + \frac{3((3x)^2-1)}{(3x)^2+1}$

$$= \frac{36x^4 + 25x^2 - 1}{(4x^2+1)(9x^2+1)}$$

③ Apply Rolle's th^m appropriately to $g(x) = (1 + \frac{x}{2}) - \sqrt{1+x}$

④ a) Intermediate Value Theorem, but a bit tricky:

For $f(x) = \tan x - 2x$ we have

$$f(1.4) > 0, f(0) = 0 \text{ : but you can}$$

show $f(\varepsilon) < 0$ for $\varepsilon > 0$ sufficiently small
then apply the Intermediate Value Th^m on $(\varepsilon, 1.4)$.

b) Intermediate Value Th^m, not tricky.