Midterm 1 − Review − Answers

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(1) $\delta = \frac{\epsilon}{2}$

(2)　(a) $\frac{1}{6}$ (factor out numerator and denominator)

　　(b) DNE (Notice it's of the form $\frac{-4}{0}$, so calculate LHS and RHS limits)

　　(c) $-\infty$

　　(d) 1 (factor out $(\ln(x))^2$ from the num and denom)

　　(e) 0 (Calculate LHS and RHS limits)

　　(f) $2\sqrt{3}$ (conjugate form)

　　(g) ∞ (first write $\cos(2x) = \frac{\cos(2x)}{\sin(2x)}$, then calculate LHS and RHS limits)

　　(h) 1 (factor out x^4 from the $\sqrt{}$)

(3) Yes (calculate LHS and RHS limits)

(4) IVT (0 and 2 work)

(5) Yes (calculate LHS and RHS limits of $\frac{f(x)-f(1)}{x-1}$)

(6) No

(7) $|x|$

(8)　(a) $f'(x) = \frac{-2}{x^3}$ (put everything under a common denominator)

　　(b) $f'(x) = \frac{3}{2\sqrt{1+3x}}$ (conjugate form)

(9) **Note:** There's a mistake in this question, replace 'find the equation' by 'show there is no tangent line to $\cdots$'
　　At some point you should get $a^2 - 4a + 16 = 0$, which has no solution

(10)　(a) $(-\infty, 0]$

　　(b) $[0, \frac{\pi}{2})$

　　(c) Start with $f(x) = f(y)$ and show $x = y$

　　(d) $f^{-1}(x) = \ln(\cos(x))$