Calculus 1A

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Comments on Homework 8

(§4.2, #13) Many could not solve the following equation for c:

$$f'(c) = -2e^{-2c} = (e^{-6} - 1)/3$$

Introducing things like $\ln(-6)$ or $\ln(e^{-6} - 1)$ are invalid since you can't take the logarithm of a negative number. Simply solve $e^{-2c} = \frac{1-e^{-6}}{6} > 0$ for c.

(§4.2, #33) Many confused $\arctan(\sqrt{x}) - \frac{\pi}{2}$ with $\arctan(\sqrt{x} - \frac{\pi}{2})$. Also, many forgot chain rule on both the $\frac{x-1}{x+1}$ and the $\sqrt{x}$.

(§4.3, #19,41) Many applied quotient rule when using power rule is more appropriate. The problem here is that many are also in the habit *rationalizing the denominator* which compounds the problem. The reason is that powers of x are artificially introduced into the numerator resulting in a *phantom* $x = 0$ root when setting $f'(x) = 0$ (e.g. when finding critical numbers). For example:

$$(x^{\frac{4}{3}} + 4x^{\frac{1}{3}})' = \tfrac{4}{3}x^{\frac{1}{3}} + \tfrac{4}{3}x^{\frac{-2}{3}} = \tfrac{4}{3}x^{\frac{-2}{3}}(x+1) = 0 \Longrightarrow x = -1$$

NOT

$$\cdots = \tfrac{4}{3}x^{\frac{1}{3}} + \tfrac{4}{3}x^{\frac{-2}{3}} = \tfrac{4}{3}x^{\frac{1}{3}}(\frac{1}{x} + 1) = 0 \Longrightarrow x = 0, -1$$