# ASSIGNMENT 27



1. (C) II ... $f(0)$ is not defined

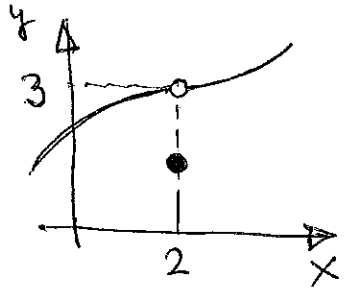
I and III are compositions of continuous functions, and $e^x+1>0$, $e^x>0$ (so that ln is defined)

2. $f'(x) = \cos(\cos(\sin(\cos x))) \cdot (-\sin(\sin(\cos x))) \cdot$

(H) $\cos(\cos(x)) \cdot (-\sin x)$

so $f'(0) = 0$ since ✗ is zero (no need to calculate remaining terms)

3. FALSE; need a counterexample




$\lim_{x \to 2} f(x) = 3$, but $f(2) \neq 3$

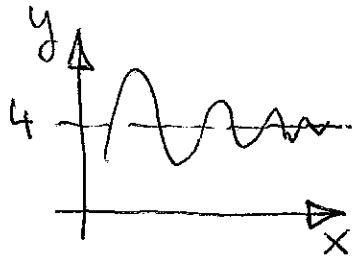
so $f$ is not cont. at $x=2$

or, algebraic example:

$$f(x) = \begin{cases} x+1 & x \neq 2 \\ 0 & x = 2 \end{cases}$$

4. FALSE; can use same counterexamples as for #3

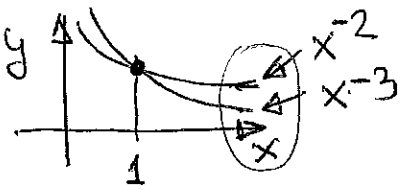
5. FALSE; a function can intersect its horizontal asymptote




f can cross $y=4$ many times!

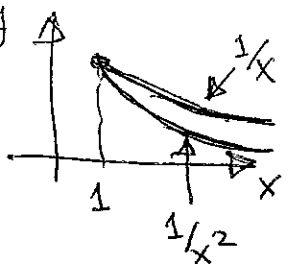
6. **TRUE**; f is a composition of two continuous functions ($\sqrt{x}$ is cont. when $x \geq 0$)

7. **TRUE**




8. **FALSE**; need a counterexample

let $f(x) = \frac{1}{x}$, $g(x) = \frac{1}{x^2}$




then $f(x) > g(x)$ for $x > 1$

but $\lim_{x \to \infty} f(x) = \lim_{x \to \infty} g(x) = 0$

9. **FALSE**; units of $n'(t)$ are $\frac{\text{monkeys}}{\text{day}}$

→ units of $\frac{n'(t)}{n(t)}$ are $\frac{\text{monkeys}}{\text{day}} \Big/ \text{monkey}$

$$= \frac{1}{\text{day}}$$

10. **TRUE**; slope of $y = \cos x$ is $y' = -\sin x$ ... largest value is 1