

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

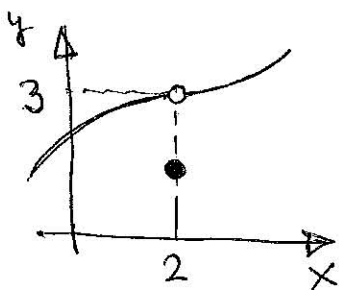
I and III are compositions of continuous functions, and  $e^x + 1 > 0$ ,  $e^x > 0$  (so that  $\ln$  is defined)

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

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

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

3. FALSE; need a counterexample



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

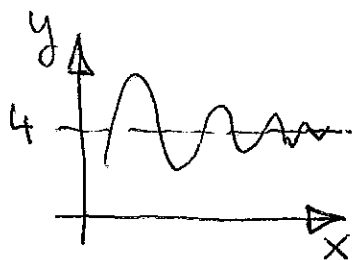
so  $f$  is not cont. at  $x=2$

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

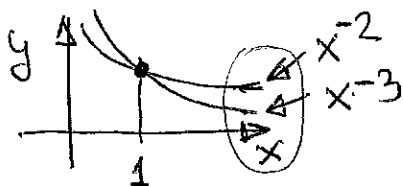
5. FALSE; a function can intersect its horizontal asymptote



$f$  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

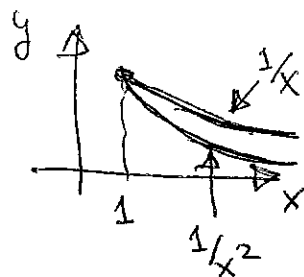


8. FALSE; need a counterexample

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

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

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



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

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

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

10. TRUE; slope of  $y = \cos x$  is

$y' = -\sin x$  ... largest value is 1