

Math 101- Conceptual Questions
(20 Problems, 1 page)

1. Explain verbally the meaning of the limit $\lim_{x \rightarrow 6} f(x) = 4$. Illustrate graphically.
2. What does it mean to say that the limit $\lim_{x \rightarrow a} f(x)$ does not exist?
3. **True or False:** If $\lim_{x \rightarrow 3} f(x) = 10$, then $f(3) = 10$.
4. What is the symbol ∞ (infinity) used for.
5. How to check if the line $x = a$ is a vertical asymptote for the curve $y = f(x)$.
6. State the Squeeze Theorem.
7. State the $\varepsilon\delta$ definition of limit.
8. How to check if a function f is continuous at a number a .
9. What are the three types of discontinuity? Illustrate graphically.
10. Under what conditions can one apply the formula $\lim_{x \rightarrow a} f(g(x)) = f(\lim_{x \rightarrow a} g(x))$.
11. State the Intermediate Value Theorem.
12. How to find the horizontal asymptotes of a function f ?
13. **True or False:** Every function must have either a vertical asymptote or a horizontal asymptote.
14. State the definition of the derivative of a function f at a number a .
15. State the definition of the derivative of a function f .
16. Write down some notations for the derivative of a function f .
17. What does it mean to say that a function f is not differentiable at a number a .
18. Find, if possible, a function f that is differentiable at $a = 1$, but not continuous at $a = 1$.
19. **True or False:** If $f(x) = e^\pi$, then $f'(x) = e^\pi$.
20. Find y' if $y = f(g(h(x)))$.