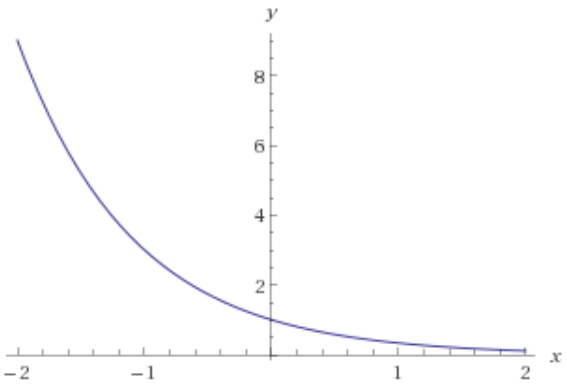
Training for Test 1

Fundamentals of Calculus I

Explain and justify your thought process.

1. For $f(x) = x^2 + 8x + 27$, find
   (a) the minimum of $f(x)$
   (b) the maximum of $f(x)$
   (c) the y-intercept of $f(x)$
   (d) all solutions to $f(x) = 2$.
2. Find $\lim_{x \to 3} \dfrac{2x^2 - 18}{x - 3}$
3. What is the limit definition of continuity at a point $x = a$?
4. Find $\lim_{x \to \infty} \dfrac{5x^3 + 3x^2 - \pi}{2x^5 + 17x^2 + 5x - 2}$.
5. Find all solutions to $\log_3(x - 2) + \log_3(x + 6) = 2$.
6. For
$$h(x) = \begin{cases} 3 & \text{if } x \geq 2 \\ -1 & \text{if } x < 2 \end{cases}$$
   What is the $\lim_{x \to 2^-} h(x)$? Is $h(x)$ continuous?
7. Evaluate $\log_{12}(\log_9(\log_5(\log_2 32)))$.
8. What is the domain and range of $e^{(e(x))} + 3$?
9. Does the graph below depict $a(x) = 3 + 1/x, b(x) = 3^{-x}$, or $c(x) = 3^{x^2}$?
10. What is the definition of an exponential function? how does such a function grow or decay?



(x from −2 to 2)