

Various questions

1. Does every function continuous on $[a, b]$ have an antiderivative on $[a, b]$?
2. Is $f(x) = 2x + 3$ integrable on $[a, b]$?
3. Is $f(x) = 2x + 3$ integrable on $[a, b]$?
4. Is $f(x) = \frac{1}{4 - x^2}$ integrable on $[0, 2]$?
5. Is $f(x) = \frac{1}{\sqrt{4 - x^2}}$ integrable on $[0, 2]$?
6. Is $f(x) = \frac{1}{x}$ integrable on $[0, \infty)$?
7. Is $f(x) = \frac{1}{x^2}$ integrable on $[0, \infty)$?
8. Find $\frac{d}{dx}|x|$.