

Quiz 2

Show your work, and write clearly. No textbooks, notes, or calculators.

1. (3pts) Given $f(x) = \sqrt{x} + 3 \cos x + 4$.
 - (a) Find **all** antiderivatives of $f(x)$. Hint: Write \sqrt{x} as a power of x .
 - (b) How can you check that your answer to part (a) is correct?
 - (c) Check part (a) using the method from part (b).

2. (5pts) Suppose you're driving at 120 feet per second when you suddenly see a moose in the highway 250 feet ahead of you and you jam on the brakes, causing you to decelerate at 30 ft/s^2 . Therefore, as you know, your velocity is $v(t) = 120 - 30t$, where t is the time in seconds since you saw the moose and hit the brakes, and v is in feet per second.
 - (a) How long will it take for your car to reach a complete stop?
 - (b) What is your stopping distance (the distance traveled during that time period)?
 - (c) How close to the moose will you be when you come to a full stop?
 - (d) Now, suppose you're tired from hunting, causing an additional reaction time of a quarter of a second, going along at your original steady 120 ft/sec, between when you see the moose and when you start the braking process described above. Will this delayed reaction time cause you to crash into the moose?

(Hint: The only part that requires calculus is part (b))

3. (2pts) Approximate the area under $f(x) = 1/x$ from $x = 1$ to $x = 5$, using four rectangles of equal width, and left endpoints. Is this a lower bound or an upper bound for the actual area? (Use common denominators when you add.)

BONUS (2pts) "Therefore, as you know, your velocity is $v(t) = 120 - 30t$." As you know, do you know?