

1. (Calculus I) I don't get the difference between $\int f(x) dx$ and $\int_a^b f(x) dx$.
2. (Calculus I) I don't understand the mean value theorem. Can you explain it?
3. (Calculus I) Why do we need to know Simpson's rule.
4. (Calculus I) What are differentials for? It seems like I can get around using a differential.
5. (Calculus I) Why do I need the second derivative test to find maximums and minimums? I think I can do everything with the first derivative test.
6. (Calculus I) We were supposed to compute $\int_0^1 x^2 dx$ using a Riemann sum but I can't do it!
7. (Calculus I) I can see where to use the second fundamental theorem of calculus but I don't see why we care about the first ftc. And besides, why do they integrate with respect to t .

Version 1:
$$\int_a^b F'(x) dx = F(b) - F(a)$$

Version 2:
$$\frac{d}{dx} \int_a^x f(t) dt = f(x)$$

8. (Calculus I) We are supposed to take the derivative

$$\frac{d}{dx} \int_{\cos x}^{\sin x} t^5 dt$$

but isn't this a function of t ? Besides, where would we ever see such a function?

9. (Calculus I) How are we supposed to do the integral

$$\int_{-\pi}^{\pi} \frac{\cos^7 x e^{-x^2+1}}{1+x^{10}} dx$$