

L^AT_EX Project

Calculus I (Spring 2015)

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Notes: This super handy little document serves as a short demo of calculus with L^AT_EX.**Prob 1:** Here's an example of how to write limit problems: $\lim_{x \rightarrow \infty} \frac{\sin x}{x} dx = 0$ **Prob 2:** Let $f(x) = x^2 + e^{2x}$.

- i. Compute the derivative $\frac{d}{dx}[f(x)]$.
Solution: $\frac{d}{dx}[f(x)] = f'(x) = 2x + 2e^{2x}$.
- ii. Compute the indefinite integral $\int f(x) dx$.
Solution: $\int f(x) dx = 2x + 2e^{2x}$.

Prob 3: Compute the definite integral $\int_0^3 \sqrt{x} dx$.

$$\int_0^4 \sqrt{x} dx = \frac{2}{3} x^{\frac{3}{2}} \Big|_0^4 = \frac{2}{3} \cdot 8 = \frac{16}{3}.$$

Prob 4: Compute the definite integral $\int_0^{\frac{\pi}{2}} \cos \theta d\theta$.

$$\int_0^{\frac{\pi}{2}} \cos \theta d\theta = \sin \theta \Big|_0^{\frac{\pi}{2}} = 1.$$

Prob 5: Expand the polynomial $(a + b)^2$:

$$\begin{aligned} (a + b)^2 &= (a + b)(a + b) \\ &= a^2 + ab + ba + b^2 \\ &= a^2 + 2ab + b^2. \end{aligned}$$

Prob 6: Here's a vertical table, for approximations, or whatever:

x	f(x)
-1	15.9888
0	15.9889
1	15.9890
2	15.990

Prob 7: Here's a horizontal table:

Value of x	1	2	3
Value of y	1	4	9

Table 1: This is a cool table.

Prob 8: A really cool table is Table 1

Hope this is useful to you. Cheers.

