Conference 1
MA 2051
10/26/2021

Review of 1. e^x
2. $\ln|x|$

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1. The (natural) exponential function:

$f(x) = e^x$ where $f(1) = e^1 = e \approx 2.71828$ (Euler's Number).

- $\frac{d}{dx} e^x = e^x$
- $e^x > 0$ for any $-\infty < x < \infty$
- $e^{a+b} = e^a e^b$
- $e^{-a} = 1/e^a$
- $e^{na} = (e^a)^n$
- $e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$ (Maclaurin Series)

Example Solve $\frac{dy}{dx} = e^x$, $y(3) = 2$

$$\int \frac{dy}{dx} dx = \int e^x dx$$

$$y(x) = e^x + C$$
$$2 = y(3) = e^3 + C$$
$$2 - e^3 = C$$

$$\therefore y(x) = e^x + 2 - e^3 = e^x - e^3 + 2$$

Try 1. $\frac{dy}{dx} = e^{-x}$, $y(0) = 1$

2. $\frac{dy}{dx} = e^{-4x}$, $y(-1) = 2$

3. $\frac{dy}{dx} = 7e^x$, $y(0) = 4$