

$$y(t) = e^t$$

$e \approx 2.718 \dots$

exponential function

$$2^3 = 2 \cdot 2 \cdot 2 = 8$$

$$\frac{d}{dt} e^t = e^t$$

$$\frac{d}{dt} 2^t = \ln(2) 2^t$$

$\Rightarrow e^t$ unique solution to
 $y' = y$ and $y(0) = 1$

Taylor series:

$$e^t = 1 + t + \frac{t^2}{2} + \frac{t^3}{6} + \frac{t^4}{24} + \dots$$

$$= 1 + \frac{t}{1!} + \frac{t^2}{2!} + \frac{t^3}{3!} + \dots$$

$$= \sum_{n=0}^{\infty} \frac{t^n}{n!}$$

$$3! = 1 \cdot 2 \cdot 3 = 6$$

$$t^0 = 1$$
$$0! = 1$$