

## GROWTH & EXPONENTS



*Lactobacillus*

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## EXPONENTIAL FUNCTION

differential equation

$$[d / dt] N(t) = k N(t)$$

solution

$$N(t) = N(0) e^{k t}$$

yogurt

$$N(t) = 3 e^{0.693 t} = 3 2^t$$

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**k**

$$N(t) = N(0) e^{k t}$$

$$N(t) = 2 N(0)$$

$$2 = e^{k t}$$

$$\text{Log}_e[2] = \text{Log}_e[e^{k t}] = k t$$

$$k = \text{Log}_e[2] / t$$

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## LINEAR TRANSFORMATION

$$N(t) = N(0) e^{k t}$$

$$\text{Log}_e[N(t)] = \text{Log}_e[N(0) e^{k t}]$$

$$\text{Log}_e[N(t)] = \text{Log}_e[N(0)] + \text{Log}_e[e^{k t}]$$

$$\text{Log}_e[N(t)] = \text{Log}_e[N(0)] + k t$$

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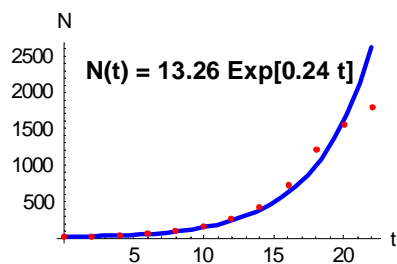
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{0, 12}  
{2, 20}  
{4, 33}  
{6, 56}  
{8, 93}  
{10, 155}  
{12, 258}  
{14, 431}  
{16, 720}  
{18, 1203}  
{20, 1556}  
{22, 1804}

Age  $t$  [hours] and Individual  
Number  $N$  for *Drosophila*  
culture over the first day



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