

Model Thinking

Scott E Page

Compounding

Exponential Growth

Rule of 72

X dollars

r% interest

$$100(1+.05) = 105$$

$$X(1+r)$$

$$105(1+.05) = 105$$

5.25

\$110.25

$$100(1.05)^6$$

$$100(1+.05)^{10}$$

$G = \text{GDP}$

$r\%$ growth

$$G(1+r)^{10}$$

Year	2%	6%
0	<u>100</u> 0	<u>1000</u>
1	<u>102</u> 0	<u>1060</u>
10	121 9	1791
35	200 0	7686
100	724	339,3

Rule of 72: Divide
the growth rate
into 72 and it tells
you (approximate)
time for GDP to
DOUBLE.

$$2^9 \quad \frac{72}{2} = (36)$$

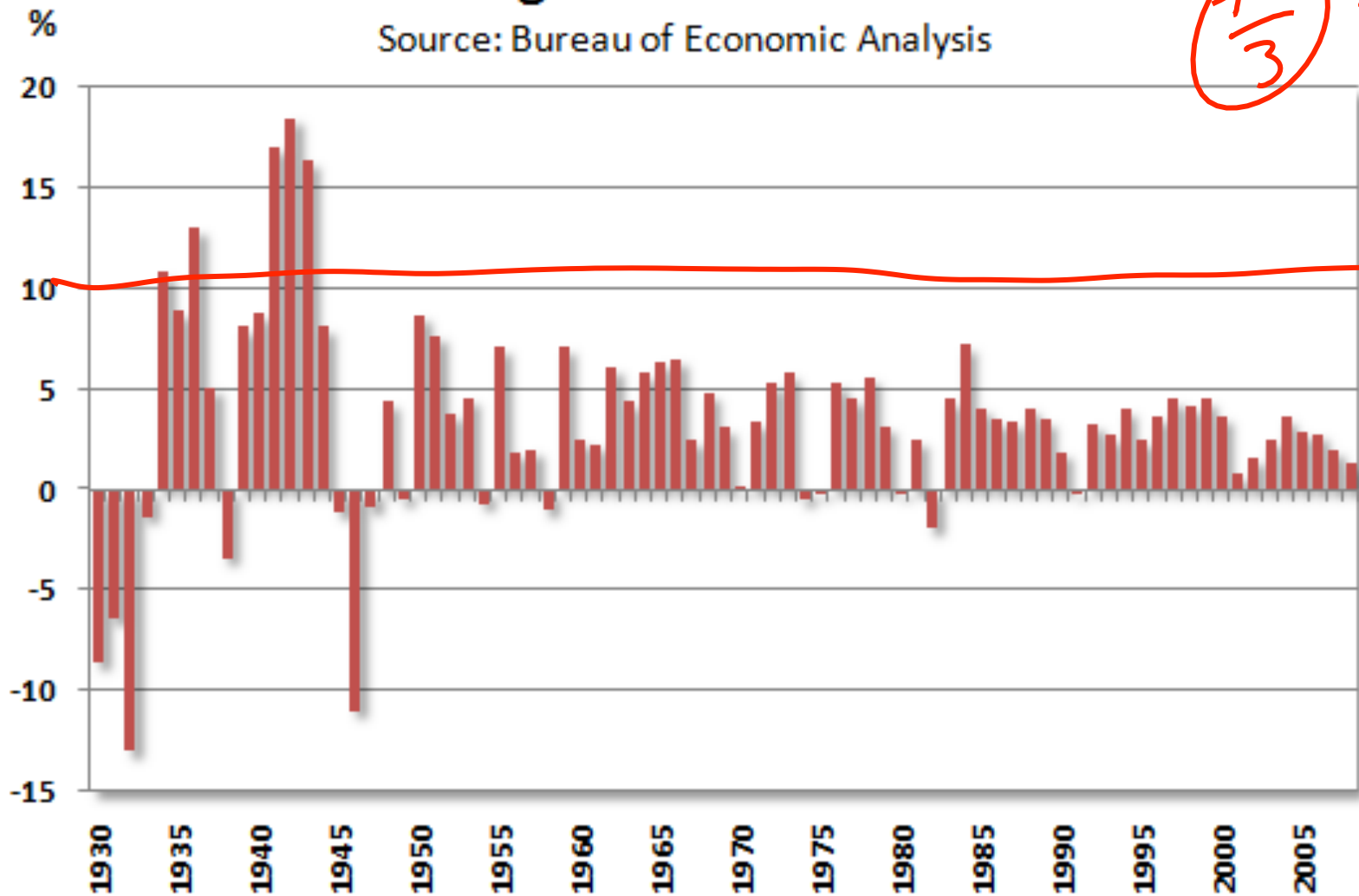
$$6^1 \quad \frac{72}{6} = (12)$$

$$2 \times 2 \times 2 = 8$$

Rule of 72

Annual Change in Real GDP Since 1930

Source: Bureau of Economic Analysis



$$7\frac{2}{4} = 18$$
$$7\frac{2}{3} = 24$$

$$X(1+r)^t$$

$$X\left(1 + \frac{r}{365 \times 24}\right)^{365 \times 24}$$

$$X(1+r)$$

$$X\left(1 + \frac{r}{365}\right)^{365}$$

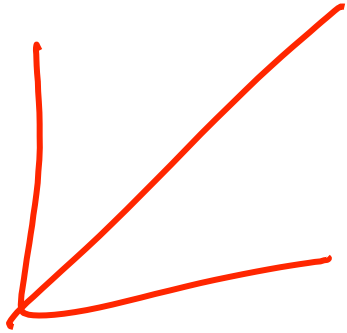
Continuous Compounding

$$\lim_{n \rightarrow \infty} (1+r/n)^{nt} = e^{rt}$$

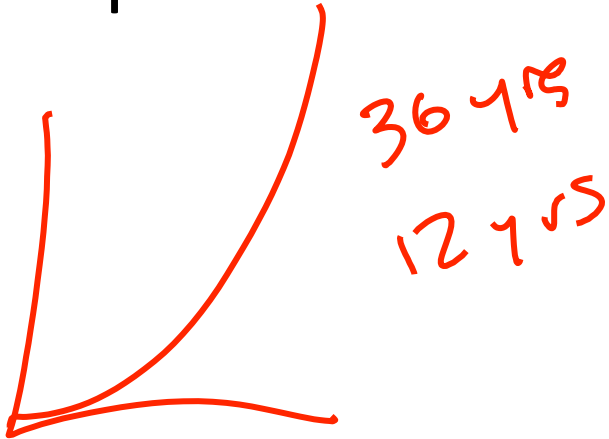
$$e = 2.71828$$

$$X(1+r)^t$$

Linear



Exponential



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