Exponential Growth and Exponential Decay

$$y = a \cdot b^x \rightarrow y = a \cdot (1 \pm r)^x$$

a = initial value

x = time

b = growth factor = $(1 \pm r)$ (+ for growth, − for decay)

r = growth/decay rate as a decimal

(ex) A lab dish contains 100 cells. The number of cells increases by 10% each hour. Complete the chart below. How many cells will there be after 9 hours?

$y = a \cdot b^x \rightarrow y = a \cdot (1 \pm r)^x$ — # of cells are growing over time

$y = 100(1 + .10)^x$ — growing 10% each hour

$y = 100(1.1)^x$

time x	# of cells y
0	100
1	110
2	121
3	133
4	146
5	161
6	177
7	195
8	
9	

$y = 100(1.1)^0$

$y = 100(1.1)^1$

$y = 100(1.1)^2$

$y = 100(1.1)^3$

$y = 100(1.1)^4$

$y = 100(1.1)^5$

$y = 100(1.1)^6$

$y = 100(1.1)^7$

$y = 100(1.1)^8$

$y = 100(1.1)^9$