

## Understanding Exponential Growth and Decay Part 2

For this second part of this lesson you are going to use your insights from calculating the specific values for the functions below to learn how to decipher and translate exponential functions in context. Specifically you will be working on writing an expression for the exponential relationships expressed in words in the problems below the chart. The form for your expressions should be as follows:

$$Ca^{kt}$$

We have filled in the chart with the correct values for your convenience. Make sure you know how to obtain all of these values.

t	$2^t$	$3^t$	$5^t$	$2(2^t)$	$-2(2^t)$	$\left(\frac{1}{2}\right)^t$	$\left(\frac{1}{3}\right)^t$	$2^{2t}$	$2^{3t}$	$2^{t/2}$	$2^{t/3}$
-1	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{5}$	1	-1	2	3	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt[3]{2}}$
0	1	1	1	2	-2	1	1	1	1	1	1
1	2	3	5	4	-4	$\frac{1}{2}$	$\frac{1}{3}$	4	8	$\sqrt{2}$	$\sqrt[3]{2}$
2	4	9	25	8	-8	$\frac{1}{4}$	$\frac{1}{9}$	16	64	2	$\frac{2}{\sqrt[3]{2}}$
3	8	27	125	16	-16	$\frac{1}{8}$	$\frac{1}{27}$	64	512	$2\sqrt{2}$	2

t	$2^t$	$2^{2t}$	$2^{t/2}$	$2^{3t}$	$2^{t/3}$	$3^t$	$5^t$	$2(2^t)$	$-2(2^t)$	$\left(\frac{1}{2}\right)^t$	$\left(\frac{1}{3}\right)^t$
-1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{8}$	$\frac{1}{\sqrt[3]{2}}$	$\frac{1}{3}$	$\frac{1}{5}$	1	-1	2	3
0	1	1	1	1	1	1	1	2	-2	1	1
1	2	4	$\frac{2}{\sqrt{2}}$	8	$\sqrt[3]{2}$	3	5	4	-4	$\frac{1}{2}$	$\frac{1}{3}$
2	4	16	2	64	$\frac{2}{\sqrt[3]{2}}$	9	25	8	-8	$\frac{1}{4}$	$\frac{1}{9}$
3	8	64	$2\sqrt{2}$	512	2	27	125	16	-16	$\frac{1}{8}$	$\frac{1}{27}$

1. My confidence doubles every day. (When  $t = 0$ , amount of confidence = 3)
2. Population of Elbonia triples every 15 years. (When  $t = 0$ , population = 30,000)
3. Number of bacteria on my toothbrush doubles every half hour. (When  $t = 0$ , number of bacteria = 100)
4. Mass of contaminants in water decreases by 20% per hour. (When  $t = 0$ , amount of contaminants = 500 mg)
5. Carbon 14 has a half life of 5730 years. (When  $t = 0$ , mass of carbon = 10 g)
6. My investments gain 15% per year. (When  $t = 0$ , investment value = \$10,000)