

Exponential Models

All mathematical models can be represented using: tables, equations and/or graphs.

What are the identifying features of an exponential?  
Table:  
Graph:  
Equation:

Given a set of data an exponential regression can be performed to determine if the best model for the data is exponential.

Linear models

- change at a **constant rate**
- a fixed amount is **added** to the quantity at regular intervals

Exponential models

- change at a **constant percent rate**
- the quantity is **multiplied** by a fixed amount at regular intervals

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Investigation p. 310

Suppose you are offered a choice of jobs.

- Job A pays \$10/h with a \$1/h raise every year.
- Job B pays \$10/h with a 10% raise every year.

• How would your wages grow under each job over 5 years?  
Organize your work in a table.

- Would you prefer to have Job A or Job B? Explain your reasoning.

Year	Job A (\$)	Job B (\$)
0	10	10
1		
2		
3		
4		
5		

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1. A population grows by each percent per year. By what factor is each year's population multiplied?  
a) 3%                      b) 5%                      c) 12%

3. Which tables of values model an exponential relation? How do you know?

a)

<i>t</i>	0	1	2	3	4	5
<i>A</i>	400	420	441	463	486.2	510.5

b)

<i>d</i>	0	1	2	3	4	5
<i>P</i>	100	82	67	55	45	37

5. Which equations model an exponential relation? How do you know?  
a)  $y = 2 + 4x$                       b)  $y = 2 + 4x^2$                       c)  $y = 2(4)^x$

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11. This table shows the growth in cell phone subscribers for a particular company.

Year	2000	2001	2002	2003	2004
Number of subscribers (thousands)	15.9	33.8	43.9	55.3	86.1

a) Determine the exponential relation  $y = ab^x$  that best fits the data, where  $x$  is the number of years since 2000 and  $y$  is the number of cell phone subscribers in thousands.

b) What do the values of  $a$  and  $b$  represent in this situation? Explain.

Homework: Pg. 315: #1-10

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