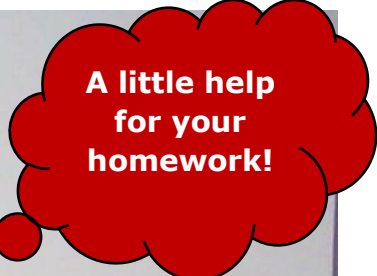


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## Measuring Jumps

*What goes up . . . . . Must come down!*



1)



Suppose you filmed a flea as it jumped straight up as high as possible. If you studied the films frame by frame, you would find that the time,  $t$ , in seconds and the  $H$ , height, in feet are related by an equation similar to this:

$t$  = time (seconds)

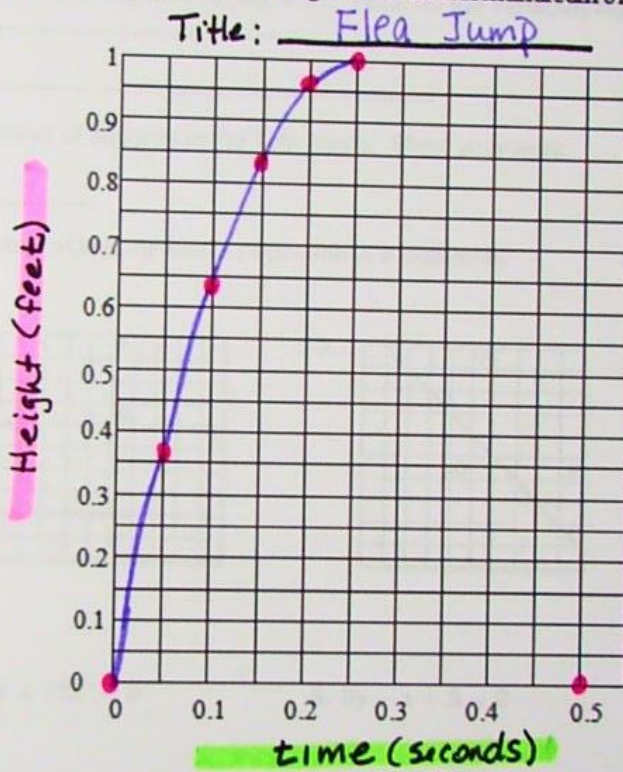
$H$  = the height (feet)

Flea Equation:

$$H = -16t^2 + 8t$$

a) Complete the table and graph for the relationship. (Round the height to the nearest hundredth of a foot.)

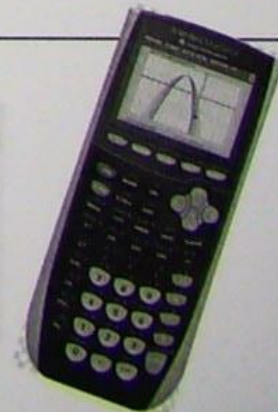
Time (seconds)	Height (feet)
0.0	0
0.05	0.36
0.1	0.64
0.15	0.84
0.2	0.96
0.25	1.00
0.3	0.96
0.35	0.84
0.4	0.64
0.45	0.36
0.5	0



Work

$t$	Work	$H$
0	$0 + 0$	0
0.05	$-.04 + .4$	.36
0.1	$-.16 + .8$	.64
0.15	$-.36 + 1.2$	.84
0.2	$-.64 + 1.6$	.96
0.25	$-1 + 2$	1
0.3	$-1.44 + 2.4$	.96
0.35	$-1.96 + 2.8$	.84
0.4	$-2.56 + 3.2$	.64
0.45	$-3.24 + 3.6$	.36
0.5	$-4 + 4$	0

b) Describe the pattern of change for the flea in the height over time, and explain how the pattern is reflected in the table and the graph.



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2) Square Numbers

a) Determine the number of smallest squares in each figure to complete the table.

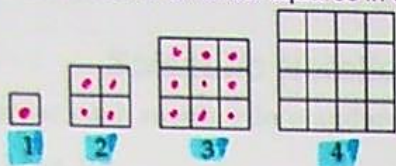


Figure Number	1	2	3	4		
# of Squares	1	4	9			

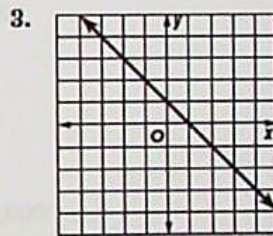
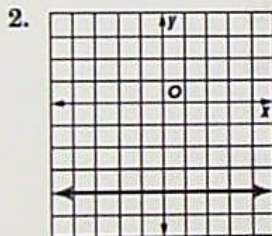
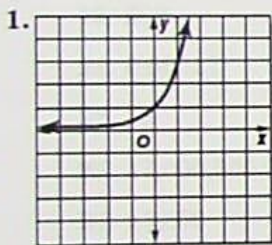
b) An equation that we can use to represent this relationship is  $y = x^2$ . What do the variables represent?

x: \_\_\_\_\_

y: \_\_\_\_\_

c) Use the equation to determine the number of squares in the 15th figure. Show your work.

**Determine whether each graph, equation, or table represents a *linear* or *nonlinear* function. Explain.**



4.  $5x - y = 15$

5.  $3y + 12x^2 = 0$

6.  $5y - x + 3 = 0$

7.  $y = 6\sqrt{x} + 10$

8.  $y = \frac{8}{x}$

9.  $y = -x^2 + 2$

10.

x	y
1	1.0
2	0.8
3	0.6
4	0.4

11.

x	y
44	0
48	2.5
52	5.0
56	7.5

12.

x	y
3	1
6	-2
9	-5
12	-14