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Lesson 6: Compounding the Problem
Ready, Set, Go

Ready

Use first and second differences to identify the pattern in each table as linear, quadratic, or neither. If the pattern is linear, write both the explicit and recursive equations. If the pattern is quadratic, write only the recursive equation. If the pattern is neither, identify it as neither and stop.

1.

n	$f(n)$
-3	-23
-2	-17
-1	-11
0	-5
1	1
2	7
3	13

a. Identify the pattern in the table as linear, quadratic, or neither.

  A. linear   **C.** neither

  B. quadratic

b. If the pattern is linear, what is the explicit equation?

c. If the pattern is linear or quadratic, what is the recursive equation?

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2.

n	$f(n)$
-3	4
-2	0
-1	-2
0	-2
1	0
2	4
3	10

a. Identify the pattern in the table as linear, quadratic, or neither.

    A. linear   **C.** neither

    B. quadratic

b. If the pattern is linear, what is the explicit equation?

c. If the pattern is linear or quadratic, what is the recursive equation?

3.

n	$f(n)$
-3	-15
-2	-10
-1	-5
0	0
1	5
2	10
3	15

a. Identify the pattern in the table as linear, quadratic, or neither.

    A. linear   **C.** neither

    B. quadratic

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b. If the pattern is linear, what is the explicit equation?

c. If the pattern is linear or quadratic, what is the recursive equation?

4.

x	y
-3	24
-2	22
-1	20
0	18
1	16
2	14
3	12

a. Identify the pattern in the table as linear, quadratic, or neither.

    A.   linear   **C.**   neither

    B.   quadratic

b. If the pattern is linear, what is the explicit equation?

c. If the pattern is linear or quadratic, what is the recursive equation?

5.

n	$f(n)$
-3	48
-2	22
-1	6
0	0
1	4
2	18
3	42

a. Identify the pattern in the table as linear, quadratic, or neither.

A. linear   **C.** neither

B. quadratic

b. If the pattern is linear, what is the explicit equation?

c. If the pattern is linear or quadratic, what is the recursive equation?

6.

n	$f(n)$
-3	4
-2	1
-1	0
0	1
1	4
2	9
3	16

a. Identify the pattern in the table as linear, quadratic, or neither.

A. linear   **C.** neither

B. quadratic

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b. If the pattern is linear, what is the explicit equation?

c. If the pattern is linear or quadratic, what is the recursive equation?

Set

Recall the equations for compound interest you used in class today: $A = P\left(1 + \frac{r}{n}\right)^{nt}$ and $A = Pe^{rt}$

7. A $\$5,000$ investment earns interest at the annual rate of 8.4% compounded monthly. What is the investment worth after one year?

8. How much will the investment earn if it is compounded continuously at the same interest rate for 10 years?

9. Fill in the table for each of the given functions. Then graph each function on the same axes.

a.

x	$f(x) = 2^x$
-2	
-1	
0	
1	
2	

x	$g(x) = 4^x$
-2	
-1	
0	
1	
2	

x	$h(x) = e^x$
-2	
-1	
0	
1	
2	

b. Graph each function on the same axes.

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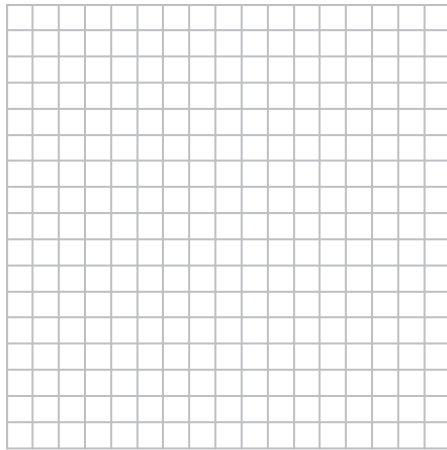
10. What point do all three functions from problem 9 share? Why?

11. Given that $f(x) = 2^x$, $g(x) = 4^x$, and $h(x) = e^x$, create a true inequality by filling in the spaces on the inequalities with $f(x)$, $g(x)$, or $h(x)$.

  a. _____ $<$ _____ $<$ _____ when $x > 0$

  b. _____ $<$ _____ $<$ _____ when $x < 0$

  c. Write an expression that describes the relationship between $f(x)$, $g(x)$, and $h(x)$ when $x = 0$.

Go

Fill in the blanks.

12. $\log_7 1 = 0$, because:

13. $\log_b 1 = 0$, because:

14. Given $\log_b a$, if the argument is 1, the answer is always _____ because _____.

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15. $\log_6 6 = 1$, because:

16. Given $\log_b b$. If the base and the argument are the same, the answer is always _____ because $b^{—} =$ _____.

17. If $\log_a x = \log_a y$, then _____ = _____.

18. $3^{\log_3 81} =$