

(1 point each) **Classify:** Classify each function on the left with its description on the right.

1. $f(n) = \frac{5}{4} \cdot 3^n$ a. Arithmetic, Recursive
D
2. $g(x) = \frac{5}{4}x + 3$ b. Arithmetic, Explicit
B
3. $t(n) = t(n - 1) \cdot 3, t(0) = 5$ c. Geometric, Recursive
C
4. $h(x) = h(x - 1) + 5, f(0) = 75$ d. Geometric, Explicit
A

(1 point each) **Matching:** Match each sequence on the left with a formula on the right.

5. 6, 24, 96, 384 a. $f(x) = 6\left(\frac{1}{4}\right)^{x-1}$
C
6. $6, \frac{3}{2}, \frac{3}{8}, \frac{3}{32}$ b. $f(x) = 4x + 2$
A
7. 6, 10, 14, 18 c. $f(x) = 4 \cdot f(x - 1), f(1) = 6$
B
8. 6, 2, -2, -6 d. $f(x) = f(x - 1) - 4, f(1) = 6$
D

(1 point each) Determine whether each sequence is **arithmetic**, **geometric**, or **neither**.

9.

Term Number	Value
1	15
2	21
3	27
4	33

Arithmetic

10.

Term Number	Value
4	7
5	21
6	35
7	49

Arithmetic

11.

Term Number	Value
7	16
8	2
9	$\frac{1}{4}$
10	$\frac{1}{32}$

Geometric

12.

Term Number	Value
15	7
16	21
17	63
18	189

Geometric

(3 points) 13.

Below is an *arithmetic* sequence. Fill in each blank in the table.

x	1	2	3	4	5
$f(x)$	9	14	19	25	29

(3 points) 14.

Below is a *geometric* sequence. Fill in each blank in the table.

x	1	2	3	4	5
$f(x)$	9	-45	225	-1,125	5,625

Joseph just landed a great job as an engineer where he will make \$60,000 a year. The company he will work for guarantees a 3% pay increase each year so its employees' salaries keep up with inflation. At the end of the 1st year Joseph will have made \$60,000 dollars.

(4 points) 15. Write the explicit function that represents Joseph's salary.

$$f(x) = 1.03^x \cdot 58252.43$$

(4 points) 16. The first term in a sequence is 91. The sequence decreases by 6% each term. Write the recursive function that will represent this situation?

$$f(x) = .94^x \cdot 96.8$$

Given the graph, description or sequence values create both an **explicit** and a **recursive function**.

17. (4 points)

David starts paying his medical bills out of a savings account that has \$1,500 in it. On the first week he pays \$50 and he plans to continue to withdraw \$50 each week.

Recursive:

$$f(x) = f(x - 1) - 50, \quad f(0) = 1500$$

Explicit:

$$f(x) = -50x + 1500$$

18. (1 point) The relationship defined in #17 is..

- a. Linear
- b. Exponential

19. (4 points)

5, 1, $\frac{1}{5}$, $\frac{1}{25}$, ...

Recursive:

$$f(x) = f(x - 1) \cdot \frac{1}{5}, \quad f(0) = 25$$

Explicit:

$$f(x) = \left(\frac{1}{5}\right)^x \cdot 25$$

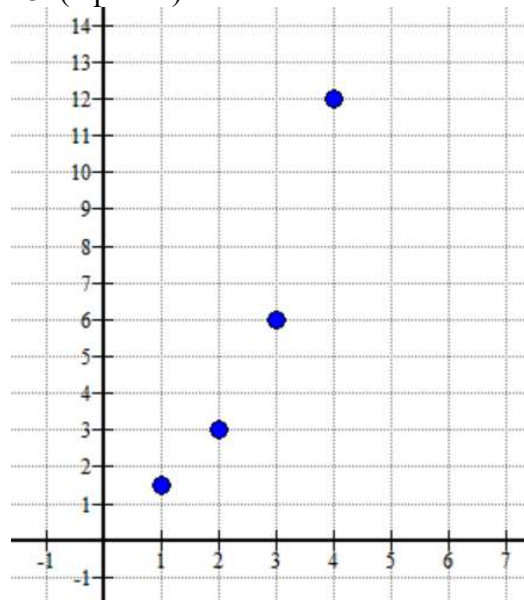
20. (1 point) The relationship defined in #19 is..

- a. Linear
- b. Exponential

21. (4 points)

Term Number	Value
4	3
5	14
6	25

23. (4 points)



Recursive:

$$f(x) = f(x - 1) + 11, \quad f(0) = -41$$

Recursive:

$$f(x) = f(x - 1) \cdot 2, \quad f(0) = \frac{3}{4}$$

Explicit:

$$f(x) = 11x - 41$$

Explicit:

$$f(x) = 2^x \cdot \frac{3}{4}$$

22. (1 point) The relationship defined in #21 is..

- a. Linear
- b. Exponential

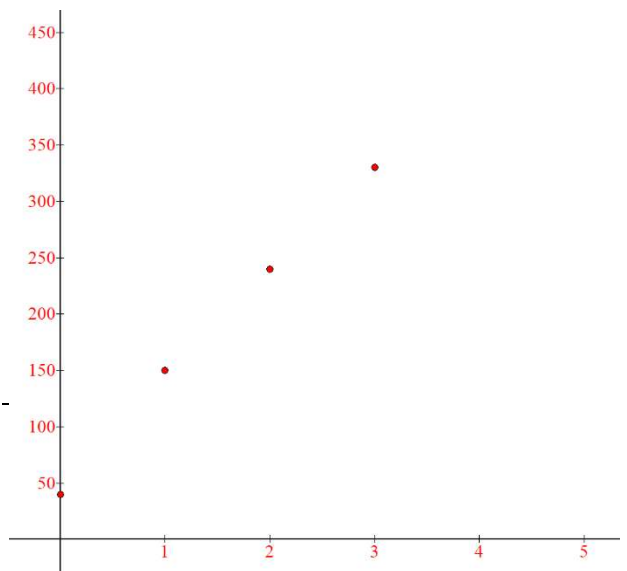
24. (1 point) The relationship defined in #23 is..

- a. Linear
- b. Exponential

There are 40 bricks already on a job site. Each additional delivery of bricks contains 90 bricks.

25. (5 points) Fill in the table and graph to describe the relationship.

# of Deliveries	Number of Bricks
0	40
1	150
2	240
3	330



26. (2 points) Is the relationship **Linear** or **Exponential**?

Linear

27. (2 points) Is the relationship **Discrete** or **Continuous**?

Discrete

28. (4 points) Write an appropriate function that shows how many bricks are on the job site for n deliveries.

$$f(0) = 40$$

$$f(n) = f(n - 1) + 90$$

29. (4 points) Explain what each piece of your function represents.

The $f(0)$ represents the number of bricks already present on the job.

The recursion rule represents that the number of bricks will increase by 90 with each delivery.

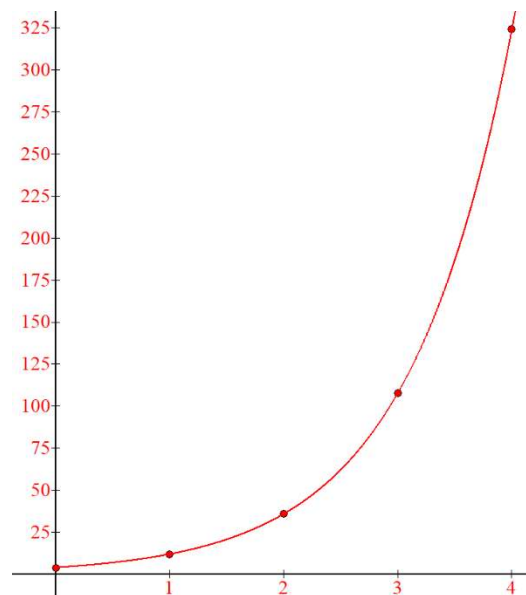
30. (2 points) Describe an appropriate domain for the function.

Positive Integers

The Lake of Distress is contaminated with flesh-eating bacteria!! The lake started with only 4 square feet infected, but as time has gone on, the bacteria are growing by a factor of 3 every hour.

31. (5 points) Fill in the table and graph to describe the relationship.

Hours	Square Feet Infected
1	12
2	36
3	108
4	324



32. (2 points) Is the relationship **Linear** or **Exponential**?

Exponential

33. (2 points) Is the relationship **Discrete** or **Continuous**?

Continuous

34. (4 points) Write an appropriate function that shows how many square feet of the lake are infected.

$$f(x) = 3^x \cdot 4$$

35. (4 points) Explain what each piece of your function represents.

The 3^x represents the factor of three that the bacteria is growing by every hour. The $\cdot 4$ represents the 4 square feet of the lake that was infected initially.

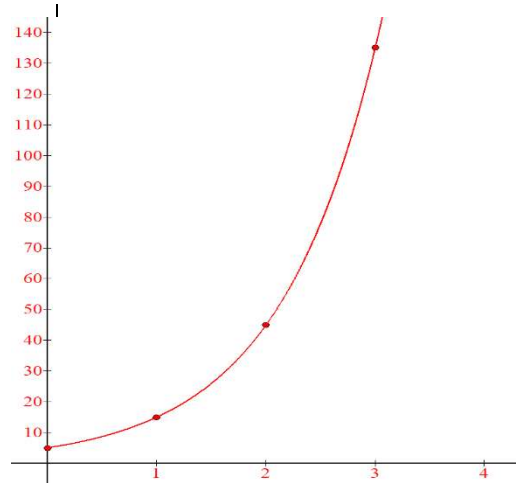
36. (2 points) Describe an appropriate domain for the function.

Positive Real Numbers

Let $f(x) = 5 \cdot 3^x$ and $g(x) = 20x + 40$ Fill in the output values for each function in the tables below, then graph the function on the corresponding graph:
(5 points each)

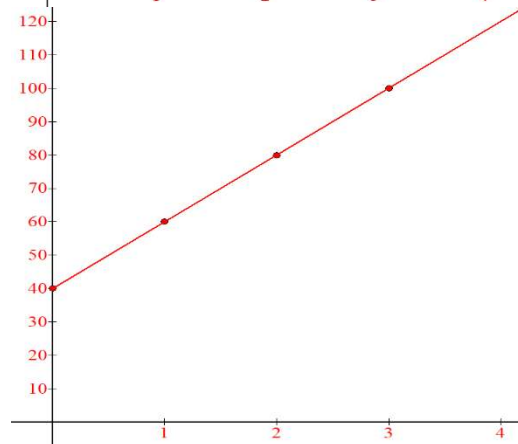
35.

x	$f(x)$
0	5
1	15
2	45
3	135



36.

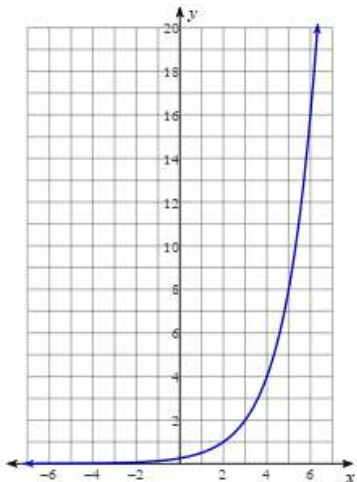
x	$g(x)$
0	40
1	60
2	80
3	100



37. (2 points) As the input (x) becomes larger and larger, which function produces a larger output?

$f(x)$ will produce a larger output as the input becomes larger.

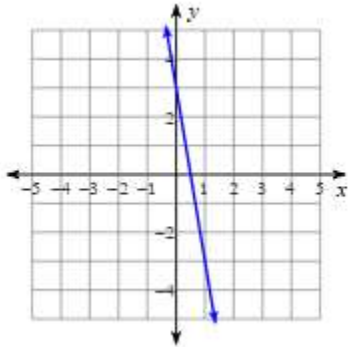
38. (4 points) Write the linear or exponential function of the graph.



x	$f(x)$
2	1
3	2
4	4

$$f(x) = 2^x \cdot \frac{1}{4}$$

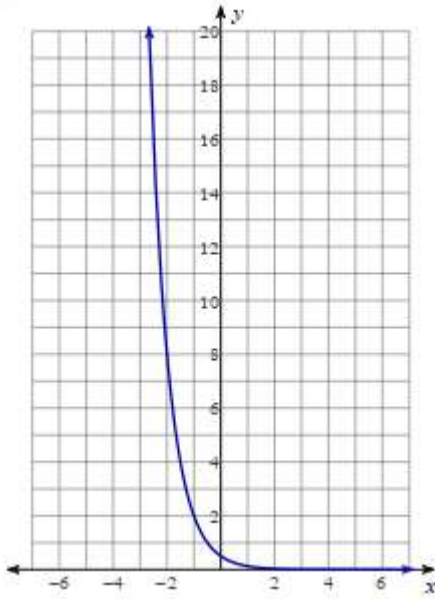
39. (4 points) Write the linear or exponential function of the graph.



x	$f(x)$
0	3
1	-3

$$f(x) = -6x + 3$$

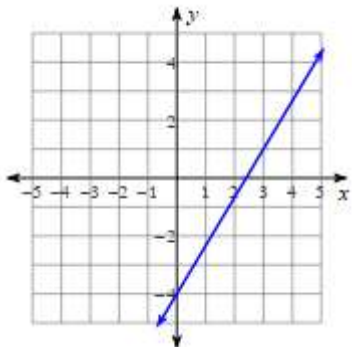
40. (4 points) Write the linear or exponential function of the graph.



x	$f(x)$
-2	8
-1	2
0	1/2

$$f(x) = \left(\frac{1}{4}\right)^x \cdot \frac{1}{2}$$

41. (4 points) Write the linear or exponential function of the graph.



x	$f(x)$
0	-4
3	1

$$f(x) = \frac{5}{3}x - 4$$