

In Exercises 1–10, Determine if the sequence is arithmetic, geometric, or other. If applicable, state the common ratio or difference.

1.  $-9, -109, -209, -309, \dots$

6.  $1, \frac{1}{2}, 0, -\frac{1}{2}, \dots$

2.  $28, 18, 8, -2, \dots$

7.  $-2, -10, -50, -250, \dots$

3.  $28, 26, 24, 22, \dots$

8.  $-1, 6, -36, 216, \dots$

4.  $-16, -6, 4, 14, \dots$

9.  $-1, -5, -25, -125, \dots$

5.  $-8, -4, 0, 4, \dots$

10.  $-3, -1, -\frac{1}{3}, -\frac{1}{9}, \dots$

In Exercises 11–14, Find the common difference, the term named in the problem, and the explicit formula

11.  $17, 11, 5, -1, \dots$

Find  $a_{39}$ 

13.  $-40, -47, -54, -61, \dots$

Find  $a_{10}$ 

12.  $5, -5, -15, -25, \dots$

Find  $a_{20}$ 

14.  $29, 38, 47, 56, \dots$

Find  $a_{29}$

In Exercises 15–18, Find the common ratio, the term named in the problem, and the explicit formula.

15. 4, 12, 36, 108, ...

Find  $a_9$

16. 54, 18, 6, 2, ...

Find  $a_5$

17. -3, 9, -27, 81, ...

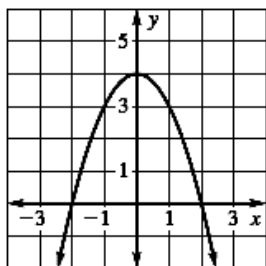
Find  $a_{10}$

18. -4, 8, -16, 32, ...

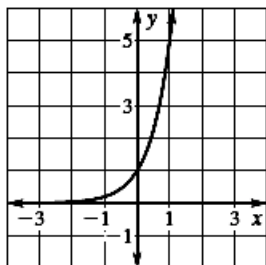
Find  $a_{11}$

In Exercises 19–28, Identify the following as increasing linear, decreasing linear, exponential growth, exponential decay, increasing quadratic or decreasing quadratic.

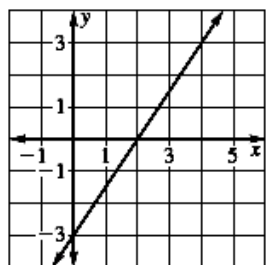
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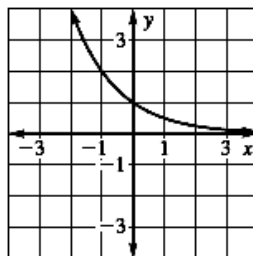
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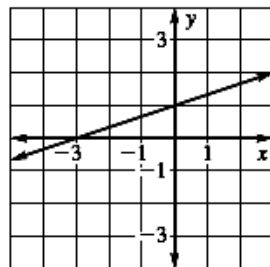
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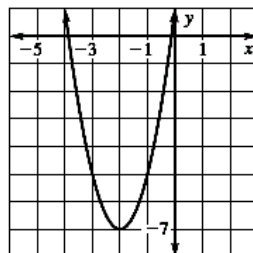
24.



25.



26.



22.

<b>x</b>	-2	-1	0	1	2
<b>y</b>	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$

23.

<b>x</b>	-1	0	1	2	3
<b>y</b>	1	4	7	10	13

27.

<b>x</b>	-1	0	1	2	3
<b>y</b>	22	17	12	7	2

28.

<b>x</b>	-1	0	1	2	3
<b>y</b>	$\frac{1}{3}$	1	3	9	27

In Exercises 29–42, Determine if the equation is increasing linear, decreasing linear, exponential growth, exponential decay, increasing quadratic or decreasing quadratic.

29.  $y = \left(\frac{5}{2}\right)^x$

30.  $y = -2x - 10$

31.  $y = 4x - 3$

32.  $y = 3\left(\frac{1}{4}\right)^x$

33.  $y = (x + 2)^2$

34.  $y = 2 \cdot 5^x$

35.  $y = -6x^2 - 5x + 4$

36.  $y = \frac{1}{4} \cdot 3^x$

37.  $y = 2x^2 + 5x - 7$

38.  $y = \frac{2}{5} \cdot 9^x$

39.  $y = 2(0.1)^x$

40.  $y = -4x + 7$

41.  $y = -(x - 3)^2$

42.  $y = \frac{1}{7} \cdot \left(\frac{3}{8}\right)^x$

Exercises 43–50, Exponential word problems.

43. Rachel invested \$4000 into an account that has a 3.5% annual interest rate. Write an equation best describes this investment after  $t$  years?

44. Damian invested \$5,000 into an account that has an interest rate of 3% and is compounded monthly. How much money will he have in 6 years?

45. A photocopier is purchased for \$7200 and it depreciates in value by 15% per year. Write an equation that best describes the value of the photocopier in  $(t)$  years?

46. Tommy bought a new sports car for \$50,000. It depreciates annually by 20% per year. Write an exponential function that describes the above data. Then find out how much will the car be worth in 5 years.

47. A coffee is sitting on Mr. Hunt's desk cooling. It cools according to the function  $T = 75(0.98)^x + 20$  where  $x$  is the time in minutes and  $T$  is the temperature in degrees.

48. From 1990 to 2000, the population of California can be modeled by  $P = 29,816,591(1.0128)^t$  where  $(t)$  is the number of years since 1990. Estimate the population in 2007.

A) What is the initial temperature of the coffee?

B) What is the temperature after 10 minutes?

49. Tara earns \$42,000 during the first year at her job. Each year after the first year, she will receive a raise of 7%.

a) Write the equation that gives Tara's salary as a function of the number of years,  $x$ , after she started her job.

b) Then use the function to determine Tara's salary after 4 years.

50. A cup of green tea contains 35 milligrams of caffeine. The average teen can eliminate approximately 12.5% of the caffeine from their system per hour.

a) Write an exponential function to represent the amount of caffeine remaining after drinking a cup of green tea.

b) Estimate the amount of caffeine in a teenager's body 3 hours after drinking a cup of green tea.

Exercises 50–53, Graph the following exponential equation. Identify the domain, range, and asymptote.

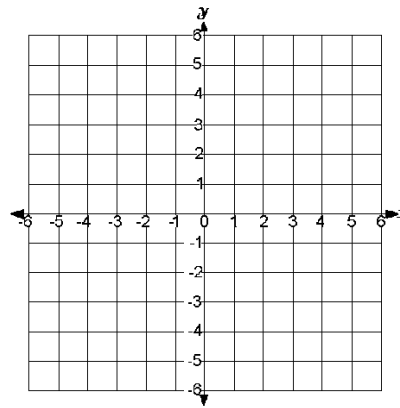
50.  $f(x) = 2x + 2$

Domain:

Range:

Asymptote:

x	y
-2	
-1	
0	
1	
2	
3	



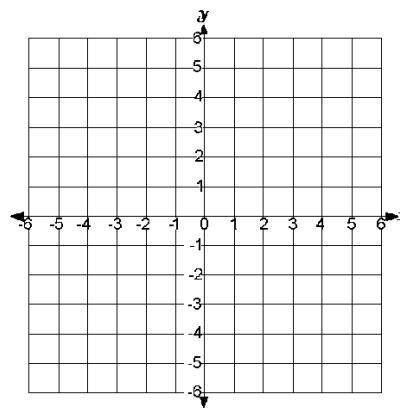
51.  $f(x) = \left(\frac{1}{2}\right)^x - 3$

Domain:

Range:

Asymptote:

x	y
-2	
-1	
0	
1	
2	
3	



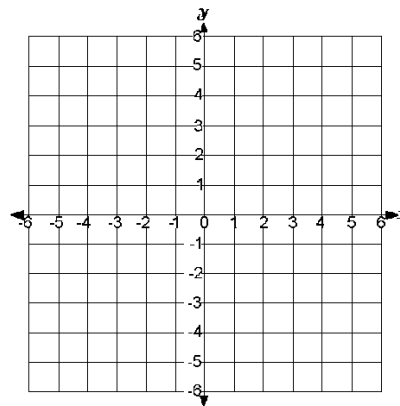
52.  $f(x) = 3^{x-1}$

Domain:

Range:

Asymptote:

x	y
-2	
-1	
0	
1	
2	
3	



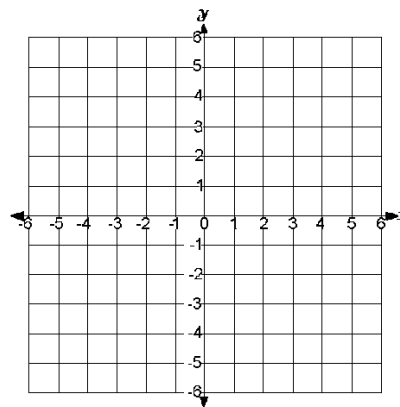
53.  $f(x) = 3\left(\frac{2}{3}\right)^x + 1$

Domain:

Range:

Asymptote:

x	y
-2	
-1	
0	
1	
2	
3	



Exercise 54, Determine the following characteristics of the exponential equation.

a) Identify the exponential function as growth or decay:

$$y = \left(\frac{1}{4}\right)^x$$

b) Identify the common ratio:

x	Y
-2	16
-1	4
0	1
1	1/4
2	1/16
3	1/64

c) Identify the y-intercept:

d) State the equation of the asymptote:

e) State the domain:

f) State the range:

g)  $f(-3) =$

h)  $f(0) =$

i)  $f(2) =$

