

9-3 Practice

Form G

Modeling Exponential Data

A jar containing 100 pennies is dumped onto a table, and all those coming up heads are removed. The remaining pennies are placed back into the jar and the process is repeated several times. The results are listed in the table at the right. Answer the following questions by referring to those results.

Trial	N
0	100
1	47
2	29
3	12

$y = 99.8$
 $S = 3$

- What is the equation of the exponential model that fits the data?
 $y = 99.8 \cdot (0.504)^x$
- What is the y-intercept of the function?
 99 mean $S, 1$
- What are the real-world domain and range of the function? Express each using inequalities.
 All real number $y > 0$
- What are the values of a and b in the equation? What is the meaning of each in the context of the problem?
 $a = 99.8$ $b = 0.504$
- Mental Math** Estimate how many more trials will be needed before there are just three pennies remaining?
calculator $f(5)$
 $n = 5$

Identify the domain and range of the following functions. Express each as inequalities.

6. $f(x) = (850) \cdot (1.25)^x$
 All real number
 $y > 0$

7. $f(x) = -(9500) \cdot (0.65)^x$
 All real number
 $y < 0$

8. $f(x) = (12) \cdot (2.0)^x$
 All real numbers
 $y > 0$

9. $f(x) = -(1024) \cdot (0.5)^x$
 All real number
 $y < 0$

10. $f(x) = (250) \cdot (0.78)^x$
 All real number
 $y > 0$

11. $f(x) = -(0.048) \cdot (1.02)^x$
 All real numbers
 $y < 0$

9-3 Practice (continued)

Form G

Modeling Exponential Data

A can of soda, initially at a temperature of 20° C is placed outside on a day when the temperature is 0° C. The temperature of the soda is measured for several minutes as shown in the table at the right. Answer the following questions by referring to those results.

Time (minutes)	Temperature (°C)
0	20
2	17
4	14
6	12

12. What is the equation of the exponential model that fits the data?

$$y = 20 \cdot (0.917)^x$$

8
10 —
— 5

13. **Reasoning** Explain how you arrived at your exponential model equation. Justify your result by showing how the equation agrees with the data.

I use calculator.

14. What will the temperature be after 10 minutes have passed?

8.4

15. How much time must pass before the temperature reaches 5° C?

16 min

Find $f(0)$, $f(1)$, and $f(-2)$ for each function. Round to the nearest tenth.

16. $f(x) = (25)(1.4)^x$

$f(0) = 25$
 $f(1) = 35$
 $f(-2) = 12.8$

17. $f(x) = (-55)(0.83)^x$

$f(0) = -55$
 $f(1) = -45.7$
 $f(-2) = -79.8$

18. $f(x) = (-12)(2.5)^x$

$f(0) = -12$
 $f(1) = -30$
 $f(-2) = -1.9$

Find the value of x for each function, such that $f(x) = 5.0$. Round to the nearest tenth.

19. $f(x) = (3)(1.1)^x$

$f(5) = 4.83$
4.8

20. $f(x) = (25)(0.83)^x$

$f(5) = 9.84$
9.8

21. $f(x) = (40)(2.5)^x$

$f(5) = 3906.3$

9-3 Practice

Form K

Modeling Exponential Data

Identify the domain and range of the function. Express the range using an inequality.

1. $f(x) = 5 \cdot 2^x$

Domain All real numbers
 $y > 0$

Tania

3. $f(x) = -2.4 \cdot 8^x$

All real number
 $y < 0$

Angela

5. $f(x) = -0.025 \cdot 16^x$

All real numbers
 $y < 0$

2. $f(x) = 12 \cdot 0.10^x$

normal
All real numbers
 $y > 0$

4. $f(x) = -15 \cdot 0.5^x$

Samuel
All real numbers.
 $y < 0$

6. $f(x) = 35 \cdot 7^x$

Natia
All real numbers
 $y > 0$

Find $f(0), f(2), f(-3)$ for each function. Round to the nearest tenth.

7. $f(x) = 2 \cdot 1.5^x$

$f(0) = 2$ $f(-3) = 0.6$
 $f(2) = 4.5$

Michelle

8. $f(x) = 26 \cdot 0.25^x$

Jose
 $f(0) = 26$ $f(3) = 1664$
 $f(2) = 1.6$

9. $f(x) = -1.8 \cdot 3^x$

$f(0) =$ $f(3) =$
 $f(2) =$

Isade

10. $f(x) = -8.3 \cdot 0.4^x$

Luis
 $f(0) = -8.3$ $f(-3) = -129.7$
 $f(2) = 7.3$

Joseph

11. $f(x) = 0.42 \cdot 5^x$

$f(0) = 1.8$ $f(-3) = -0.1$
 $f(2) = 16.2$

12. $f(x) = -17 \cdot 1.6^x$

Mias
 $f(0) = -17$ $f(-3) = -4.2$
 $f(2) = -43.5$

Use the table at the right for Exercises 13-15. The table shows the annual enrollment for a high school that opened in 2000.

High School Enrollment					
Years Since Opening	0	1	2	3	4
Number of Students	20	36	65	117	210

15

13. Which type of function best models the data?

exponential

14. Write an equation to model the data.

$$y = 20 \cdot 1.8^x$$

15. If this trend continues, predict the enrollment of the high school in 2015.

134,933