



Lesson Check

Do you know HOW?

Which type of function best models each set of data points?

- $(0, 11), (1, 5), (2, 3), (3, 5), (4, 11)$
- $(-4, -10), (-2, -7), (0, -4), (2, -1), (4, 2)$
- $(-1, 8), (0, 4), (2, 1), (3, 0.5)$

Do you UNDERSTAND?



MATHEMATICAL PRACTICES

- Reasoning** Can the y -values in a set of data pairs have both a common ratio and a common difference? Explain why or why not.
- Writing** Explain how to decide whether a linear, exponential, or quadratic function is the most appropriate model for a set of data.



Practice and Problem-Solving Exercises



MATHEMATICAL PRACTICES

A Practice

Graph each set of points. Which model is most appropriate for each set?

See Problem 1.

- $(-2, -3), (-1, 0), (0, 1), (1, 0), (2, -3)$
- $(-2, -8), (0, -4), (3, 2), (5, 6)$
- $(-3, 6), (-1, 0), (0, -1), (1, -1.5)$
- $(-2, 5), (-1, -1), (0, -3), (1, -1), (2, 5)$
- $(-1, -5\frac{2}{3}), (0, -5), (2, 3), (3, 27)$
- $(-3, 8), (-1, 6), (0, 5), (2, 3), (3, 2)$

Which type of function best models the data in each table? Use differences or ratios.

See Problem 2.

12.

x	y
0	0
1	1.5
2	6
3	13.5
4	24

13.

x	y
0	-5
1	-3
2	-1
3	1
4	3

14.

x	y
0	1
1	1.2
2	1.44
3	1.728
4	2.0736

Which type of function best models the data in each table? Write an equation to model the data.

See Problem 3.

15.

x	y
0	0
1	3
2	11.3
3	24.7
4	43.3

16.

x	y
0	5
1	2
2	0.79
3	0.32
4	0.128

17.

x	y
0	2
1	1.52
2	1
3	0.49
4	0

18. **Sports** The number of people attending a school's first five football games is shown in the table below. Which type of function best models the data? Write an equation to model the data.

Game	1	2	3	4	5
Attendance	248	307	366	425	484

19. **Banking** The average monthly balance of a savings account is shown in the table at the right. Which type of function best models the data? Write an equation to model the data.

Month	Balance (\$)
0	540
1	556.20
2	572.89
3	590.07
4	607.77



20. **Error Analysis** Tom claims that, because the data pairs (1, 4), (2, 6), (3, 9), and (4, 13.5) have y-value with a common ratio, they are best modeled by a quadratic function. What is his error?
21. a. Make a table of five ordered pairs for each function using consecutive x -values. Find the common second difference.
 i. $f(x) = x^2 - 3$ ii. $f(x) = 3x^2$ iii. $f(x) = 4x^2 - 5x$
 b. What is the relationship between the common second difference and the coefficient of the x^2 -term?
 c. **Reasoning** Explain how you could use this relationship to model data.
22. **Think About a Plan** The number of visitors at a Web site over several days is shown in the table at the right. What is an equation that models the data?
- Does the graph of the data suggest a type of function to use?
 - Will your equation fit the data exactly? How do you know?
23. **Open-Ended** Write a set of data pairs that you could model with a quadratic function.

Day	Visitors
1	52
2	197
3	447
4	805
5	1270

- STEM** 24. **Zoology** A conservation organization collected the data on the number of frogs in a local wetland, shown in the table at the right. Which type of function best models the data? Write an equation to model the data.

Year	Number of Frogs
0	120
1	101
2	86
3	72
4	60

25. The table below shows the projected population of a small town. Let $t = 0$ correspond to the year 2020.
- Graph the data. Does the graph suggest a linear, exponential, or quadratic model?
 - Find the rate of change in population with respect to time from one data pair to the next. How do the results support your answer to part (a)?
 - Write a function that models the data shown in the table.
 - Use the function from part (c) to predict the town's population in 2050.
 - Suppose the projected population s of another small town is represented by the function $s = 50t + 1300$. Let $t = 0$ correspond to the year 2020. Write an expression that can be used to find the difference in population of the two towns.

Year, t	0	5	10	15
Population, p	5100	5700	6300	6900