1_3 Practice

Form G

Modeling with Quadratic Functions

Find an equation in standard form of the parabola passing through the points.

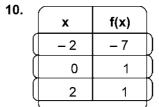
2.
$$(1, -4), (2, -3), (3, -4)$$

3.
$$(2, -8), (3, -8), (6, 4)$$

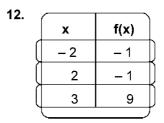
5.
$$(-1, -12), (0, -6), (3, 0)$$

8.
$$(-3, 2), (1, -6), (4, 9)$$

9.	x	f(x)
	– 1	7
	1	5
	3	11
•		



11.	х	f(x)
	– 1	-6
	1	4
	2	12



- **13.** The table shows the number *n* of tickets to a school play sold *t* days after the tickets went on sale, for several days.
 - **a.** Find a quadratic model for the data.
 - **b.** Use the model to find the number of tickets sold on day 7.
 - **c.** When was the greatest number of tickets sold?

Day, t		Number of Tickets Sold, n
	1	32
$ brack oxedsymbol{\mathbb{L}}$	2	64
	4	74

- **14.** The table gives the number of pairs of skis sold in a sporting goods store for several months last year.
 - **a.** Find a quadratic model for the data, using January as month 1, February as month 2, and so on.
 - **b.** Use the model to predict the number of pairs of skis sold in November.
 - **c.** In what month were the fewest skis sold?

Month, t	Number of Pairs of Skis Sold, s
Jan	82
Mar	42
May	18

Name	Class Da	ite

4-3

Practice (continued)

Form G

Modeling with Quadratic Functions

Determine whether a quadratic model exists for each set of values. If so, write the model.

15.
$$f(-1) = -7$$
, $f(1) = 1$, $f(3) = 1$

16.
$$f(-1) = 13$$
, $f(0) = 6$, $f(2) = -8$

17.
$$f(2) = 2$$
, $f(-4) = -1$, $f(-2) = 0$

18.
$$f(2) = 6$$
, $f(0) = -4$, $f(-2) = -6$

19. a. Complete the table. It shows the sum of the counting numbers from 1 through n.

		$\overline{}$	$\overline{}$	$\overline{}$		$\overline{}$	7
	Number, n	1	2	3	4	5	brack
ĺ	Sum, s	1	3	6			floor
						$\overline{}$	Τ

- **b.** Write a quadratic model for the data.
- **c.** Predict the sum of the first 50 counting numbers.
- **20.** On a suspension bridge, the roadway is hung from cables hanging between support towers. The cable of one bridge is in the shape of the parabola $y = 0.1x^2 7x + 150$, where y is the height in feet of the cable above the roadway at the distance x feet from a support tower.
 - **a.** What is the closest the cable comes to the roadway?
 - **b.** How far from the support tower does this occur?
- 21. The owner of a small motel has an unusual idea to increase revenue. The motel has 20 rooms. He advertises that each night will cost a base rate of \$48 plus \$8 times the number of empty rooms that night. For example, if all rooms are occupied, he will have a total income of $20 \times $48 = 960 . But, if three rooms are empty, then his total income will be $(20-3) \times ($48 + $8 \cdot 3) = 17 \times $72 = 1224 .
 - **a.** Write a linear expression to show how many rooms are occupied if *n* rooms are empty.
 - **b.** Write a linear expression to show the price paid in dollars per room if *n* rooms are empty.
 - **c.** Multiply the expressions from parts (a) and (b) to obtain a quadratic model for the data. Write the result in standard form.
 - **d.** What will the owner's total income be if 10 rooms are empty?
 - **e.** What is the number of empty rooms that results in the maximum income for the owner?