1-3 Additional Practice

Name ___Tesla___

Piecewise-Defined Functions

1. A phone company offers a monthly data plan for $10 a month. The plan includes 2 megabytes of data, and charges $0.10 per megabytes above the 2 megabytes of data.

a. Complete a table for this scenario.

Number of megabytes	Total Cost of the Bill ($)
0	10
1	10
2	10
3	$10 + .1(1) = 10.10$
4	$10 + .1(2) = 10.20$
5	$10 + .1(3) = 10.30$
6	$10 + .1(4) = 10.40$

⑦

b. Write a piecewise-defined function for $M(x)$, the cost for x megabytes of data used in a month.

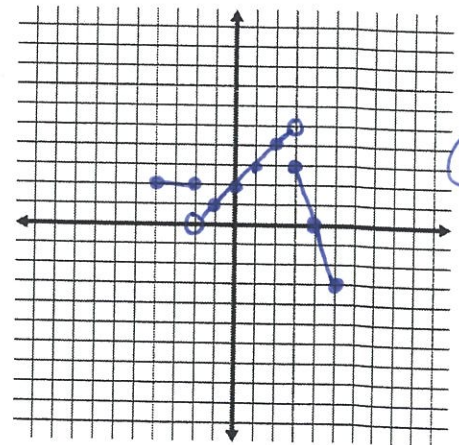$$\begin{cases} M(x) = 10 & 0 \le x \le 2 \\ M(x) = 10 + .1(x-2) & x > 2 \end{cases}$$

④

2. Graph the piecewise-defined function. State the domain and range. Identify whether the function is increasing, constant, or decreasing on each interval of the domain.

Constant
Inc
Dec.

$$f(x) = \begin{cases} 2, & -4 \le x \le -2 \\ x+2, & -2 < x < 3 \\ -3x+12, & 3 \le x \le 5 \end{cases}$$

$x+2$

-2	0
-1	1
0	2
1	3
2	4
3	5

$-3x+12$

3	3
4	0
5	-3

⑥

3. Write the rule that defines the piecewise-defined function in the graph.

$$\begin{cases} y = 6, & -\infty < x < 0 \\ y = \frac{4}{1}x - 6, & 0 \le x \le 4 \end{cases}$$
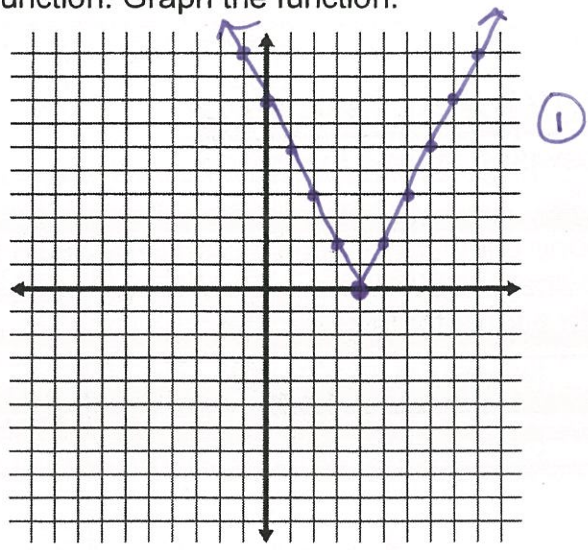
④

21
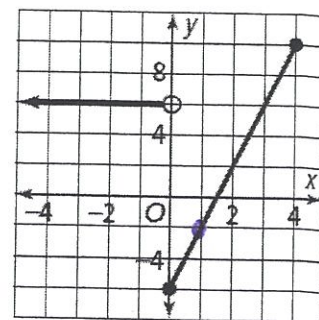
4. Write the function *f* as a piecewise-defined function. Graph the function.

$f(x) = |2x - 8|$

$2x - 8 = 0$
$2x = 8$
$x = (4, 0)$

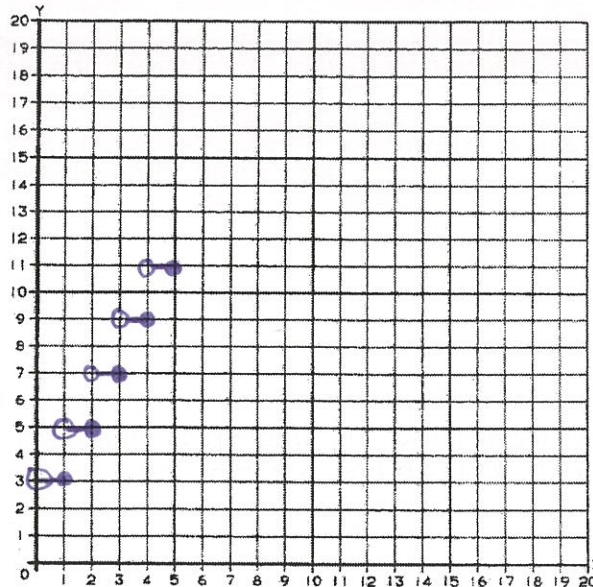$$f(x) = \begin{cases} 2x - 8, & 4 \le x < \infty \\ -2x + 8, & -\infty < x \le 4 \end{cases}$$

④

①

5. A shipping service uses the weight of a package to determine its postage. The charge is \$3 for the first pound and \$2 for each additional pound up to 5 pounds. What are the domain and range of the function?

$$f(x) = \begin{cases} 3, & 0 < x \le 1 \\ 5, & 1 < x \le 2 \\ 7, & 2 < x \le 3 \\ 9, & 3 < x \le 4 \\ 11, & 4 < x \le 5 \end{cases}$$

D: $0 < x \le 5$

R: 3, 5, 7, 9, 11

③

1 - open ○
1 - closed ●
1 - segments

What transformations of $f(x) = x^2$ are being applied to get the function g?

6. $g(x) = 3(x + 2)^2$ ②

Skinnier
left 2

7. $g(x) = -(x - 5)^2 + 1$ ③

reflected over x- axis
right 5
up 1

8. Derek walks to his best friend's house at a rate of 1 block per minute, then turns around and walks home. The graph shows the distance Derek walks in the given amount of time. Write an equation for the graph.

$y = -|x - 10| + 10$ OR $\begin{cases} y = 2x, & 0 \le x \le 10 \\ y = -2x + 20, & 10 \le x \le 20 \end{cases}$