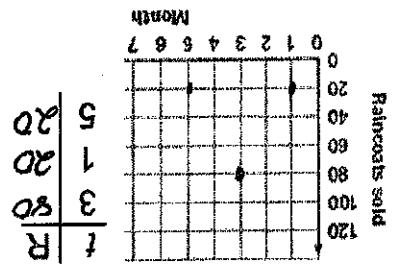


Example 3

Applications of Absolute Value

A raincoat retailer has modeled the number of raincoats sold from Jan. through May by the function $R = -30t - 3t + 80$. Assume that $t=1$ is January. What is the maximum number of raincoats sold in one month? In what month is the maximum reached?

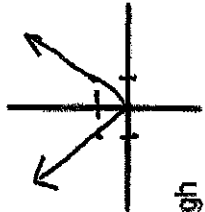


Graphs

Value

Absolute

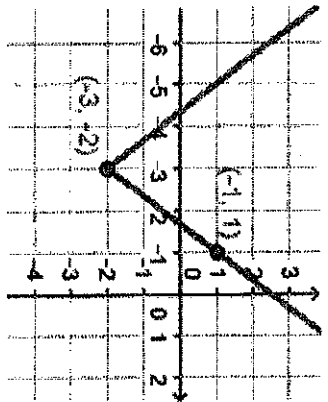
The parent graph of an absolute value function is $|x| = y$



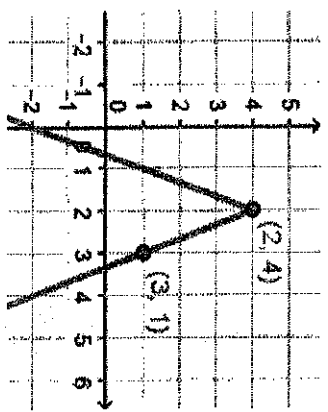
and passes through $(0,0)$

with vertex at $(0,0)$

Example 2 Write an absolute value equation

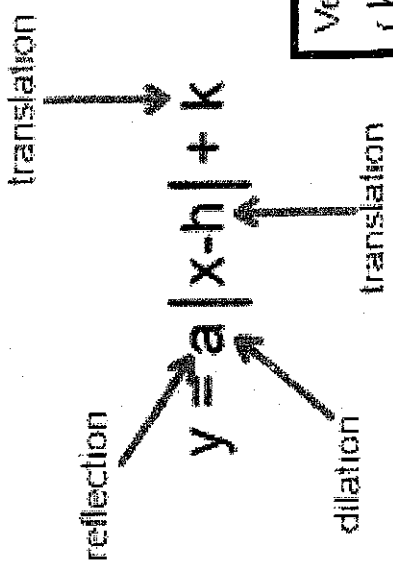


$y = \frac{3}{2}|x+3| - 2$



$y = -3|x-2| + 4$

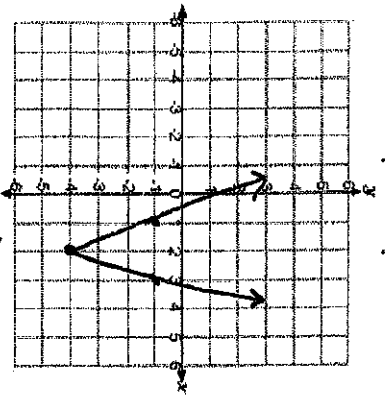
Vertex (h, k)



Translations

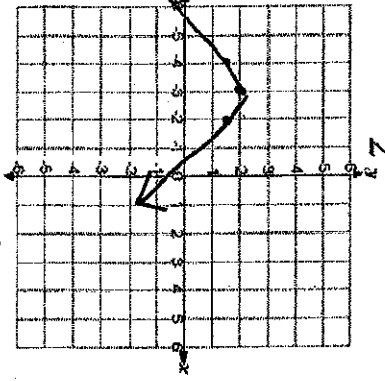
Example 1 Graph and describe an absolute value function

A) $y = 3|x-2| - 4$



Vertex: $(2, -4)$
Opens: up
Slope: 3

B) $y = -\frac{1}{2}|x+3| + 2$



Vertex: $(-3, 2)$
Opens: down
Slope: $m = -\frac{1}{2}$

Name:

Period:

Date:

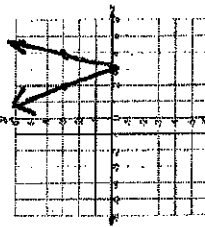
Practice Worksheet: Absolute Value Graphs

Identify the vertex. Determine if the graph opens up or down (circle one). Determine if the graph is narrower, wider, or the same width (circle one) as the parent graph.

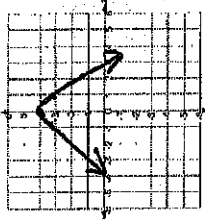
<p>1) $y = - x + 1$ Vertex: (-1, 0) Opens: UP / DOWN NARROWER / WIDER / SAME</p>	<p>2) $y = 7 x - 3 - 4$ Vertex: (3, 4) Opens: UP / DOWN NARROWER / WIDER / SAME</p>	<p>3) $y = -\frac{2}{3} x - 1$ Vertex: (1, 0) Opens: UP / DOWN NARROWER / WIDER / SAME</p>
<p>4) $y = \frac{5}{2} x + 9 - 1$ Vertex: (-9, -1) Opens: UP / DOWN NARROWER / WIDER / SAME</p>	<p>5) $y = \frac{3}{4} x + 3 - 6$ Vertex: (-3, -6) Opens: UP / DOWN NARROWER / WIDER / SAME</p>	<p>6) $y = - x + 5$ Vertex: (0, 5) Opens: UP / DOWN NARROWER / WIDER / SAME</p>

Graph the function.

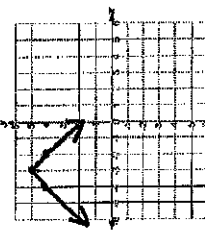
7) $y = 3|x - 3|$



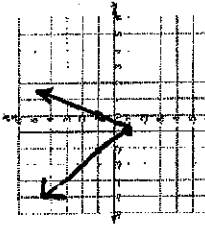
8) $y = -|x| + 4$



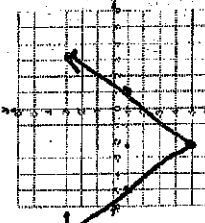
9) $y = -|x + 3| + 5$



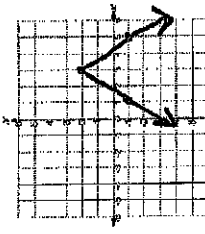
10) $y = 2|x + 1| - 1$



11) $y = \frac{4}{3}|x + 2| - 5$



12) $y = -\frac{3}{2}|x - 3| + 2$

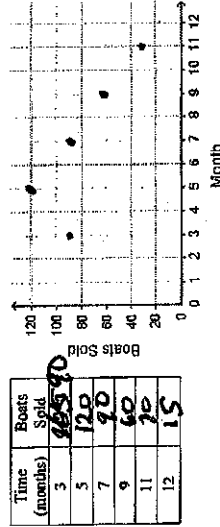


Write the equation of the graph. Then give its range.

<p>13] Equation: $y = x + 1 + 2$ Range: $[-2, \infty)$</p>	<p>14] Equation: $y = - x + 3 - 2$ Range: $(-\infty, -2]$</p>	<p>15] Equation: $y = -2 x - 2 + 3$ Range: $[-1, 3]$</p>
<p>16] Equation: $y = \frac{1}{2} x + 2 - 3$ Range: $[-3, \infty)$</p>	<p>17] Equation: $y = - x - 1$ Range: $(-\infty, 0]$</p>	<p>18] Equation: $y = 4 x - 2$ Range: $[-2, \infty)$</p>

19] The number of boats B a boat dealer sells in each month of the year from March to December can be modeled by the function $B = -15(t - 5) + 120$ where t is the time in months and $t = 1$ represents January.

A) Complete the table of values and then graph the function.



B) What is the maximum number of sales in one month? In what month is the maximum reached?
(May, 120)

C) What is the minimum number of sales in one month? In what month is the minimum reached?
Dec - 15

LESSON
27

Practice

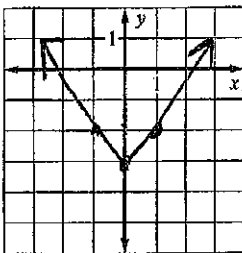
For use with pages 121-129

For the function (a) tell whether the graph *opens up* or *down*, (b) identify the vertex, and (c) tell whether the function is *wider*, *narrower*, or the *same width* as the graph of $y = |x|$.

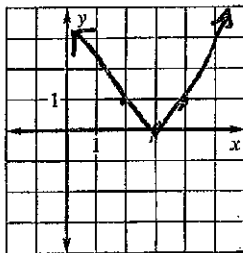
1. $y = -|x + 1|$
 - down
 - $(-1, 0)$
 - same
2. $f(x) = 7|x - 3| - 4$
 - up
 - $(3, -4)$
 - ~~wider~~
 narrower
3. $y = -4|x + 2| + 2$
 - down
 - $(-2, 2)$
 - ~~wider~~
 narrower
4. $f(x) = 2|x + 2| + 8$
 - up
 - $(-2, 8)$
 - narrower
5. $y = -\frac{2}{3}|x + 1|$
 - down
 - $(-1, 0)$
 - wider
6. $f(x) = -|x| - 5$
 - down
 - $(0, -5)$
 - same
7. $y = \frac{5}{2}|x + 9| - 1$
 - up
 - $(-9, -1)$
 - narrower
8. $f(x) = \frac{7}{8}|x + 3| - 9$
 - up
 - $(-3, -9)$
 - narrower
9. $y = -\frac{7}{5}|x - 1| + 1$
 - down
 - $(1, 1)$
 - narrower

Graph the function.

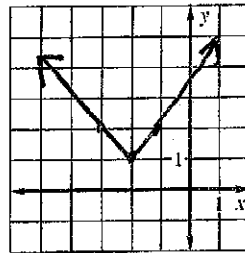
10. $y = |x| - 3$



11. $f(x) = |x - 3|$

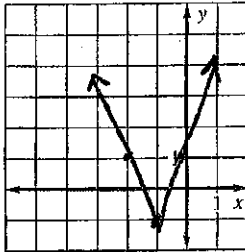


12. $y = |x + 2| + 1$

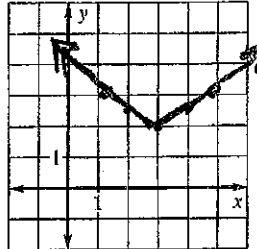


LESSON 2.7 Practice *continued*
For use with pages 121-129

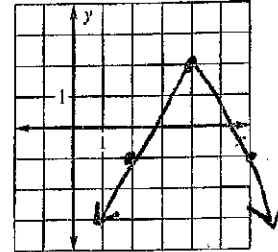
13. $y = 2|x + 1| - 1$



14. $f(x) = \frac{1}{2}|x - 3| + 2$

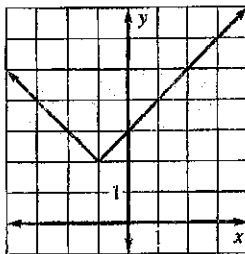


15. $y = -\frac{3}{2}|x - 4| + 2$

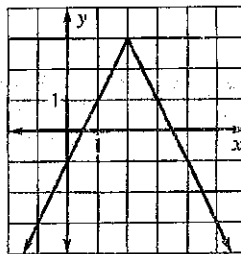


Write an equation of the graph shown.

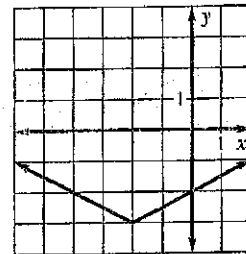
16.



17.

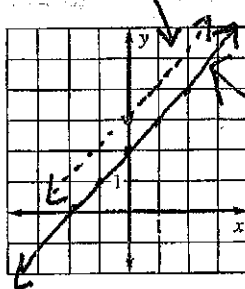


18.

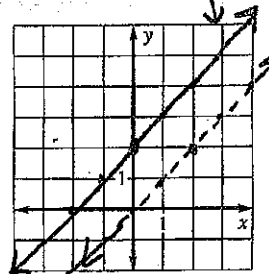


Let $f(x) = x + 2$. Sketch $f(x)$ and then sketch the function y given by the transformation to $f(x)$.

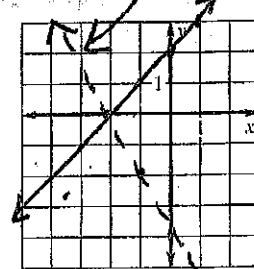
19. $y = f(x) + 1$



20. $y = f(x - 2)$



21. $y = -2f(x)$



$$\begin{array}{r|l} x & y \\ -2 & 0 \\ -1 & -1 \\ 0 & -2 \end{array}$$

$$-2f(x)$$

$$\begin{array}{r|l} x & y \\ -2 & 0 \\ -1 & -2 \\ 0 & -4 \end{array}$$