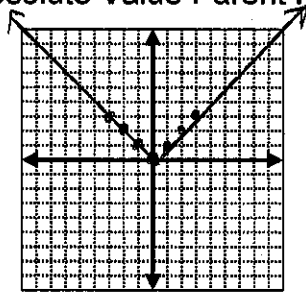


Section: 6-7 Graphing Absolute Value Equations & Identifying Solutions

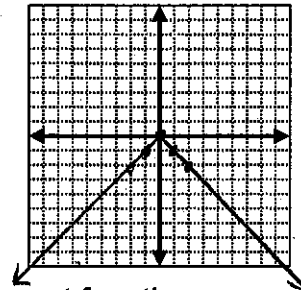
Translating Absolute Value Graphs

- Translation: A shift of a graph horizontally, vertically, or both. The graph has the same shape and size but the position has changed.

Graph the Absolute Value Parent Function $y = |x|$

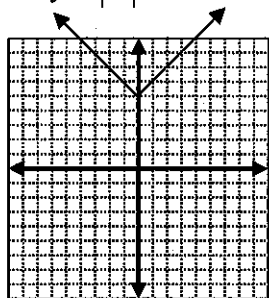


Graph $y = -|x|$



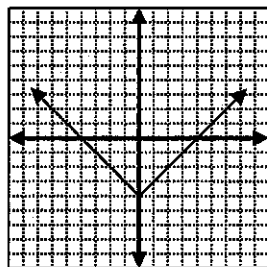
Example 1: Compare the following absolute value graphs to the parent function.

A. $y = |x| + 5$



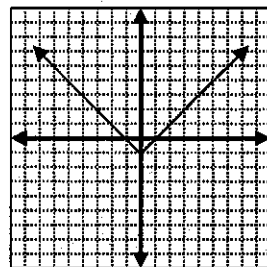
every point moved up 5

B. $y = |x| - 4$



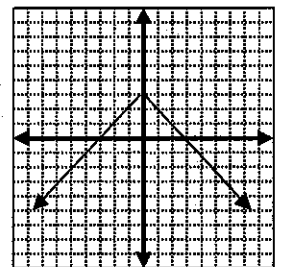
every point moved down 4

C. $y = |x| - 1$



every point moved down 1

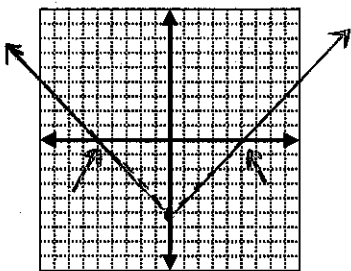
D. $y = -|x| + 3$



flipped over x-axis then every point moved up 3

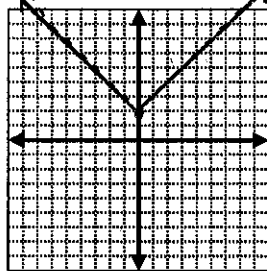
Example 2: Graph the following equations. Identify the solutions (the x-intercepts).

A. $y = |x| - 5$



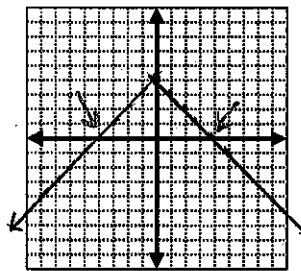
Solutions: $(-5, 0)$
 $(5, 0)$

B. $y = |x| + 2$



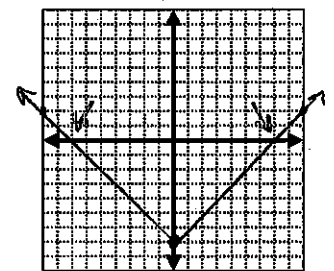
Solutions: none

C. $y = -|x| + 4$



Solutions: $(-4, 0)$
 $(4, 0)$

D. $y = |x| - 7$



Solutions: $(-7, 0)$
 $(7, 0)$

The graph of $y = |x| + k$ is the translation of $y = |x|$.

- If k is positive, the graph of $y = |x|$ is shifted up k units
- If k is negative, the graph of $y = |x|$ is shifted down k units

Example 3: Write an equation for each translation of $y = |x|$.

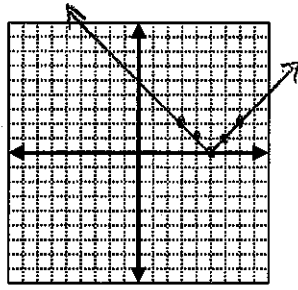
A. Translated down 9 units $y = |x| - 9$

B. Translated 13 units up $y = |x| + 13$

Example 4: Complete the following tables and graph each absolute value equation.

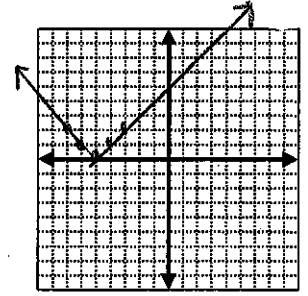
A. $y = |x - 5|$

x	y
3	2
4	1
5	0
6	1
7	2



B. $y = |x + 5|$

x	y
-7	2
-6	1
-5	0
-4	1
-3	2

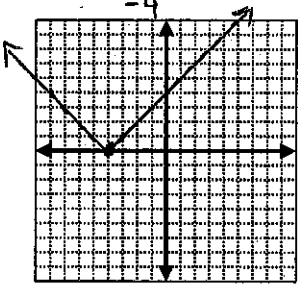


The graph of $y = |x - h|$ is the translation of $y = |x|$.

- If h is positive, the graph of $y = |x|$ is shifted left h units
- If h is negative, the graph of $y = |x|$ is shifted right h units

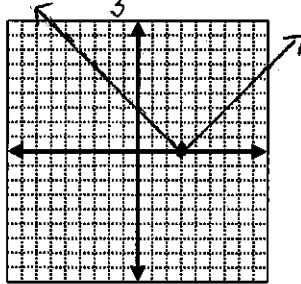
Example 5: Graph the following equations. Identify the solutions (x-intercepts).

A. $y = |x + 4|$



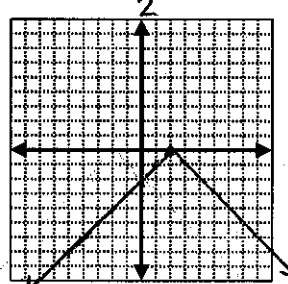
Solutions: $(-4, 0)$

B. $y = |x - 3|$



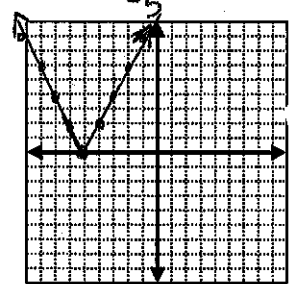
Solutions: $(3, 0)$

C. $y = -|x - 2|$



Solutions: $(2, 0)$

D. $y = |2x + 10|$



Solutions: $(-5, 0)$

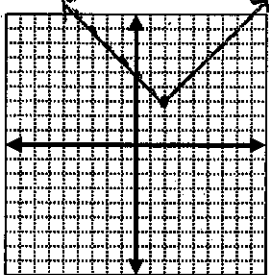
Example 6: Write an equation for each translation of $y = |x|$.

A. Translated 10 units to the right. $y = |x - 10|$

B. Translated 7 units left. $y = |x + 7|$

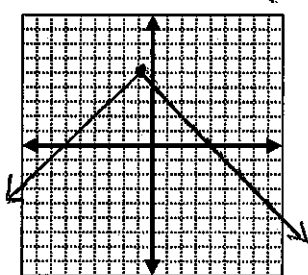
Example 7: Graph the following equations. Identify the solutions (x-intercepts).

A. $y = |x - 2| + 3$ $(2, 3)$



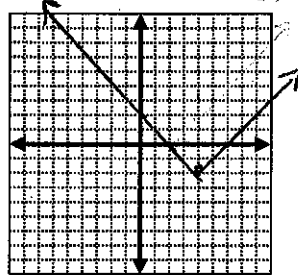
Solutions: none

B. $y = -|x + 1| + 5$ $(-1, 5)$



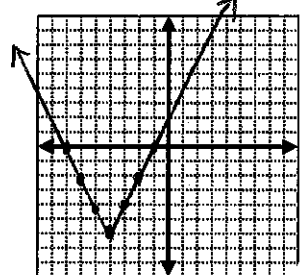
Solutions: $(-6, 0)$
 $(4, 0)$

C. $y = |x - 4| - 2$ $(4, -2)$



Solutions: $(2, 0)$
 $(6, 0)$

D. $y = |2x + 8| - 6$ $(-4, -6)$



Solutions: $(-7, 0)$
 $(-1, 0)$