Name _____ Date _____

5.5 Notetaking with Vocabulary

Core Concepts

Solving Linear Equations by Graphing

Step 1 To solve the equation $ax + b = cx + d$, write two linear equations.

$ax + b = cx + d$

$y = ax + b$ and $y = cx + d$

$y = ax + b$
$y = cx + d$ } now a system

Step 2 Graph the system of linear equations. The x-value of the solution of the system of linear equations is the solution of the equation $ax + b = cx + d$.

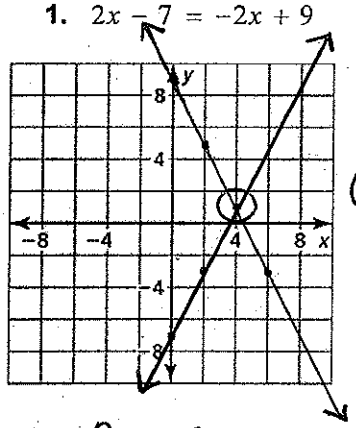
(x, y)

x =

Practice:

In Exercises 1–9, solve the equation by graphing. Check your solution(s).

1. $2x - 7 = -2x + 9$



(4, 1)

x = 4

Check:

$2(4) - 7 \stackrel{?}{=} -2(4) + 9$

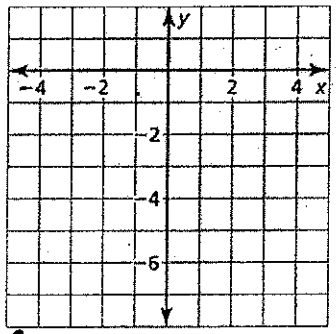
$8 - 7 \stackrel{?}{=} -8 + 9$

$1 = 1$ ✓

$y = 2x - 7$

$y = -2x + 9$

2. $3x = x - 4$



Algebraically...

$2x - 7 = -2x + 9$

$+2x \quad +2x$

$4x - 7 = 9$

$+7 \quad +7$

$\frac{4x}{4} = \frac{16}{4}$

$x = 4$

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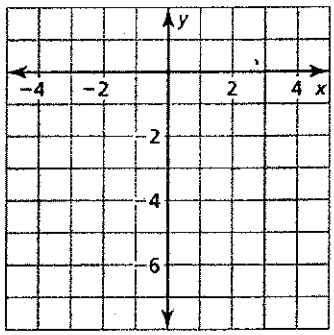
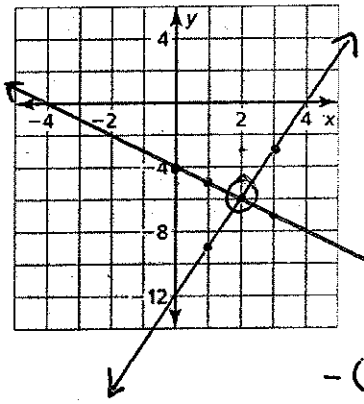
3. $4x + 1 = -2x - 5$



4. $-x - 4 = 3(x - 4)$ $\quad -x-4 = 3x-12$



$y = -x - 4$

$y = 3x - 12$

$(2, -6)$

$x = 2$

$-(2) - 4 \stackrel{?}{=} 3(2-4)$

$-6 \stackrel{?}{=} 3(-2)$

$-6 = -6$ ✓

Solving Absolute Value Equations by Graphing

How many solutions are possible with absolute value equations? 2 solutions (2, 1 or 0)

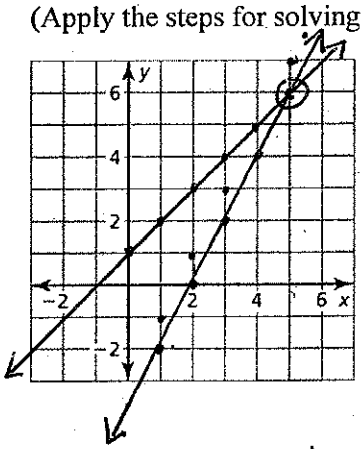
Recall that an absolute value equation of the form $|ax + b| = |cx + d|$ has two related equations.

$ax+b = cx+d$ or $ax+b = -(cx+d)$

$ax+b = -cx-d$

Solve $|x + 1| = |2x - 4|$ by graphing. Check your solutions.

(Apply the steps for solving an equation by graphing to each of the related equations.)



(5, 6)

$x = 5$

$|x+1| = |2x-4|$

$x+1 = 2x-4$

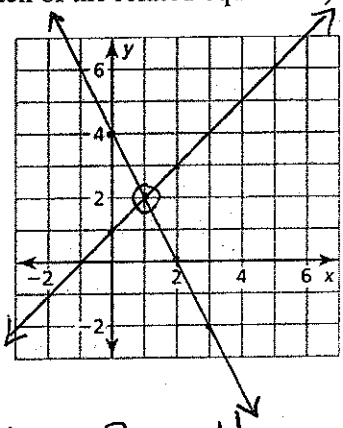
$y = x+1$

$y = 2x-4$

Check: $|5+1| = |2(5)-4|$

$|6| = |6|$

$6 = 6$ ✓



(1, 2)

$x = 1$

$x+1 = -2x+4$

$y = x+1$

$y = -2x+4$

Check.

$|1+1| \stackrel{?}{=} |2(1)-4|$

$|2| = |-2|$

$2 = 2$ ✓

Two solutions: $x = 1$, $x = 5$

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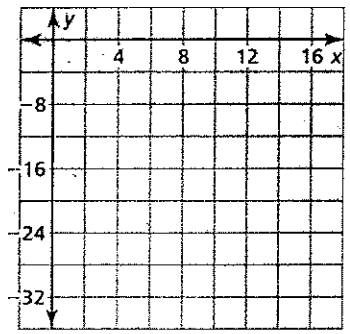
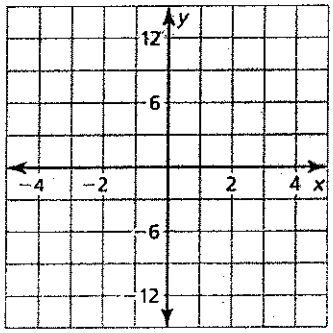
5.5 Notetaking with Vocabulary (continued)

5. $|3x| = |2x + 10|$

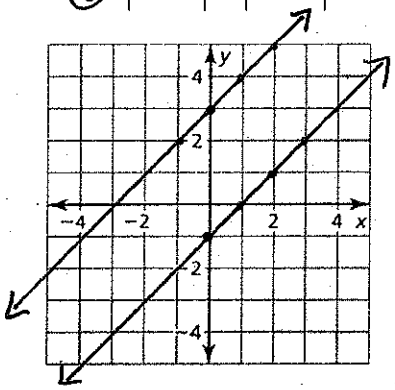


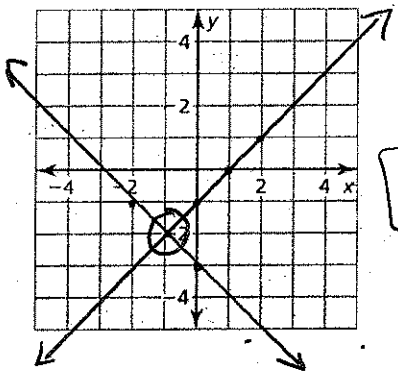


6. $|x - 1| = |x + 3|$

$x - 1 = x + 3$ or $x - 1 = -(x + 3)$

$x - 1 = -x - 3$





$y = x - 1$

$y = x + 3$

No solution

$y = x - 1$

$y = -x - 3$

$(-1, -2)$

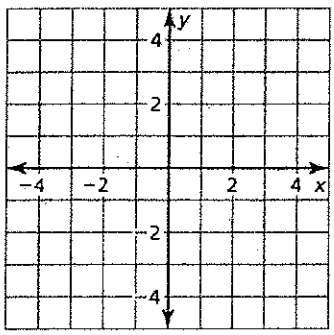
$x = -1$ One solution

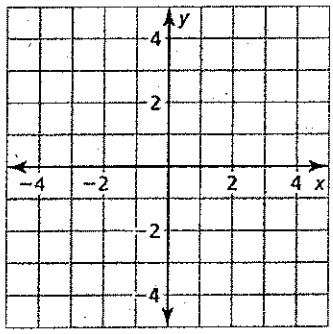
$|-1 - 1| \stackrel{?}{=} |-1 + 3|$

$|-2| = |2|$

$2 = 2$ ✓

7. $|x + 4| = |2 - x|$





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