Understanding Graphs as Solution Sets

Algebra 1 •Section 5.8

Name: _____	Date: _____	Score: _____ / 12

Quick Review and Helpful Hints

Linear relationships have a constant rate of change. Use slope, intercepts, points, and context to move between equations, tables, graphs, and real-world meanings.

▷ **Example:** Write the line with slope 2 through $(3, 11)$.
Work: Use $y = 2x + b$. Substitute the point: $11 = 2(3) + b$, so $b = 5$.

★ **Answer:** $y = 2x + 5$

Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Does $(2, 5)$ satisfy $y = 2x + 1$?

2. Does $(3, 4)$ satisfy $x + y = 10$?

3. Find one solution to $y = -x + 6$.

4. Is $(1, 3)$ a solution of $y > 2x$?

5. Is $(4, 1)$ a solution of $x + y \leq 5$?

6. Describe the graph of $y = 3x - 2$.

7. Which side is shaded for $y > x + 1$?

8. Is the boundary solid or dashed for $y < 2x - 5$?

9. Find the y value when $x = 2$ in $2x + y = 9$.

10. Does $(0, 0)$ satisfy $3x - 2y \geq 1$?

Word Problems

11. A budget is $4x + 2y \leq 40$. Does buying 6 of x and 5 of y fit?

12. A parking lot model is $c + t \leq 120$. What does the solution set represent?

Answer Keys

1. Yes
2. No
3. Example: $(0, 6)$
4. Yes
5. Yes
6. A line
7. Above the line
8. Dashed
9. 5
10. No
11. Yes
12. All car/truck combinations with at most 120 vehicles

Step-by-Step Explanations

1. Try it out: $2(2) + 1 = 5$ matches the y-value, so the point really is a solution.

2. Add the coordinates: $3 + 4 = 7$, which misses 10, so this point doesn't work.

3. Pick any x you like — choosing $x = 0$ makes $y = 6$, giving the easy point $(0, 6)$.

4. Check the inequality: $3 > 2(1)$ is true, so this point lands in the solution region.

5. Here $4 + 1 = 5$, and the $\leq$ sign welcomes equality, so the point counts.

6. Any linear equation with x and y to the first power draws out as a straight line.

7. Since you want y bigger than the boundary, shade upward where the y-values are higher.

8. A strict $<$ leaves the boundary out, so draw it dashed to show it's not included.

9. Plug in $x = 2$ for $4 + y = 9$, then subtract to find $y = 5$.

10. The origin gives 0 on the left, and $0 \geq 1$ is false, so $(0, 0)$ is not a solution.

11. Tally the cost: $4(6) + 2(5) = 34$, which stays under the 40 limit, so it fits the budget.

12. Each point in the shaded region is a car-and-truck mix that stays within the lot's capacity.

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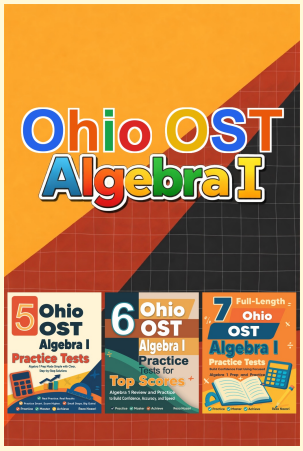

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