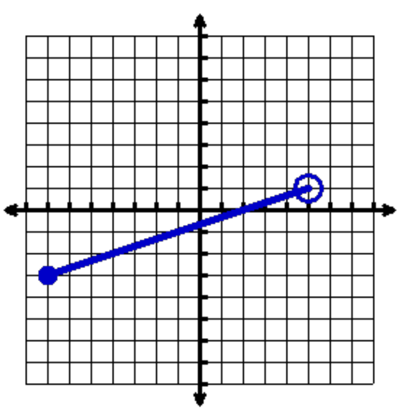
EXAMPLES OF DOMAINS AND RANGES FROM GRAPHS

Important notes about Domains and Ranges from Graphs:

- Remember that **domain** refers to the x-values that are represented in a problem and **range** refers to the y-values that are represented in a problem.
- Sometimes it isn't possible to list all the values that x or y can be because the graph is **continuous** and made up of an infinite number of points, like a line, a ray, or even a segment.
- In a continuous graph, to determine the **domain**, you should focus on looking **left to right of the graph**.
- In a continuous graph, to determine the **range**, you should focus on looking **bottom to top of the graph**.
- We use **interval notation** to help us describe the domain and range for graphs that represent continuous situations.
- Please review the following information to help you describe the domain and range for three different types of continuous graphs.

Example 1: A continuous graph with two endpoints.



Domain: {-7 ≤ x < 5}

- Notice that this graph has two endpoints, so the graph starts and stops and the **domain covers all x-values between the two endpoints** which makes it a continuous graph.
- Since the left and right endpoints are at (-7, -3) and (5, 1), the graph covers all **x-values between the x-values of -7 and -3.**
- Notice that the first endpoint is a closed circle so it includes that point; but the second endpoint is an open circle, so it does not include that point.
- Therefore, the graph covers **all x-values ≥ -7 AND all x-values < 5** – we write that in interval notation as {-7 ≤ x < 5}

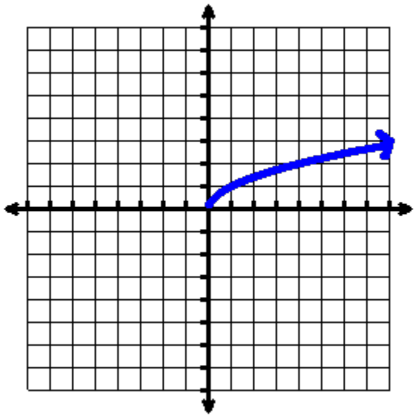
Range: {-3 ≤ y < 1}

- Notice that this graph has two endpoints, so the graph starts and stops and the **range covers all y-values between the two endpoints** which makes it a continuous graph.
- Since the bottom and top endpoints are at (-7, -3) and (5, 1), the graph covers all **y-values between the y-values of -3 and 1.**
- Notice that the first endpoint is a closed circle so it includes that point; but the second endpoint is an open circle, so it does not include that point.
- Therefore, the graph covers **all y-values ≥ -3 AND all y-values < 1** – we write that in interval notation as {-3 ≤ y < 1}

Important Note:

- To find the domain for a graph with two endpoints, always identify the x-values of the point farthest to the left and the point farthest to the right.
- For the range, you want the y-values of the lowest point and the highest point.

Example 2 – a continuous graph with only one endpoint (so continues forever in the other direction)



Note: If the arrow were pointing to the left, the domain would be ≤ the x-value. If the arrow were pointing down, the range would ≤ the y-value.

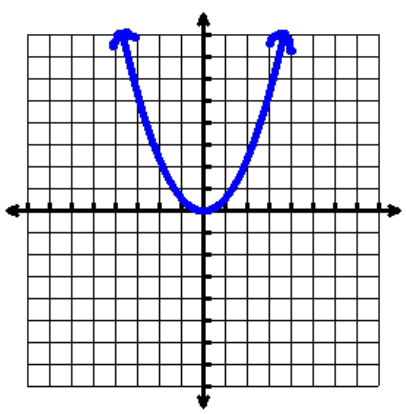
<u>Domain: {x ≥ 0}</u> (remember to focus on left to right of the graph for domain of a continuous graph):

- Notice that this graph has one endpoint at (0, 0) and an arrow to the right indicating that it continues forever in the positive x direction.
- Therefore, this graph covers all x-values that are greater than or equal to 0 – there is no stopping point on the right side of the graph.
- We write the domain in interval notation as {x ≥ 0}.

<u>Range: {y ≥ 0}</u> (remember to focus on bottom to top of the graph for range of a continuous graph):

- Notice that this graph has one endpoint at (0, 0) and an arrow pointing up indicating that it continues forever in the positive y direction.
- Therefore, this graph covers all y-values that are greater than or equal to 0 – there is no stopping point on the upper side of the graph.
- We write the range in interval notation as {y ≥ 0}.

<u>Example 3 – a continuous graph that has two arrows:</u>



Note: If one of the arrows were pointing up and one of the arrows were pointing down, then the range would be all real numbers.

<u>Domain: {x = all real numbers}</u> (remember to focus on left to right of the graph to determine the domain for a continuous graph)

- Notice that this graph has an **arrow on the left side** of the graph and an **arrow on the right side** of the graph.
- This indicates that the graph **continues forever in the left direction and forever in the right direction**.
- This means that the graph covers **all possible x-values** – we call that all real numbers in algebra.
- Therefore, we can write the domain in interval notation as: {x = all real numbers}.

<u>Range: {y ≥ 0}</u> (remember to focus on bottom to top of the graph to determine the range of a continuous graph)

- Notice that the **graph's lowest point is at (0, 0)** (the bottom of the parabola) – indicating that the y-values start at 0.
- However, notice at the **top of the graph there are arrows pointing up** – this indicates the graph continues in the positive y direction forever.
- So, the graph covers **all y-values greater than or equal to 0.**
- We can write the range in interval notation as: {y ≥ 0}.

Name: ____ Period: _____ Date: ____________________

DOMAIN AND RANGE MATCHING ACTIVITY

Read the attached page of notes first below beginning this activity. It gives you examples of domain and range problems just like these.

Match each domain and range given in this table with a graph labeled from <u>A to L</u> on the attached page. Only use Graphs A – L for this page. Write the letter of your answer in the blank provided for each problem.

_______ 1. Domain: $\{-4 \leq x \leq 4\}$ Range: $\{-4 \leq y \leq 4\}$ Function: NO	_______ 2. Domain: $\{-3 < x \leq 5\}$ Range: $\{y = -1\}$ Function: YES	_______ 3. Domain: $\{-4 \leq x \leq 2\}$ Range: $\{-2 \leq y \leq 4\}$ Function: YES
_______ 4. Domain: $\{x > 0\}$ Range: $\{y = 4\}$ Function: YES	_______ 5. Domain: $\{-6 \leq x \leq 6\}$ Range: $\{0 \leq y \leq 6\}$ Function: YES	_______ 6. Domain: $\{x = -5\}$ Range: $\{-2 < y < 6\}$ Function: NO
_______ 7. Domain: $\{x \geq 0\}$ Range: {all real numbers} Function: NO	_______ 8. Domain: $\{-3 \leq x \leq 4\}$ Range: $\{-2 \leq y \leq 4\}$ Function: NO	_______ 9. Domain: {all real numbers} Range: {all real numbers} Function: YES
_______ 10. Domain: $\{-7 \leq x < 5\}$ Range: $\{-3 \leq y < 1\}$ Function: YES	_______ 11. Domain: {all real numbers} Range: $\{y \geq 0\}$ Function: YES	_______ 12. Domain: $\{-3 < x < 4\}$ Range: $\{0 \leq y \leq 5\}$ Function: YES

CONTINUES ON THE BACK SIDE!

Name: ____ Period: _____ Date: __________________

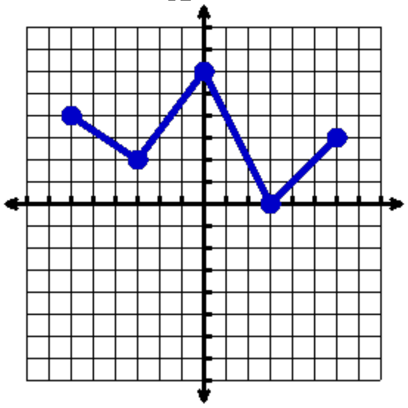
DOMAIN AND RANGE MATCHING ACTIVITY

Match each domain and range given in this table with a graph labeled from <u>M to X</u> on the attached page. Only use Graphs M to X for this page. Write the letter of your answer in the blank provided for each problem.

_______ 13. Domain: $\{-6 \le x \le 3\}$ Range: $\{-6 \le y \le -1\}$ Function: YES	_______ 14. Domain: $\{0 \le x < 5\}$ Range: $\{0 \le y < 7\}$ Function: YES	_______ 15. Domain: $\{-5 \le x < 0\}$ Range: $\{-5 < y \le -1\}$ Function: YES
_______ 16. Domain: $\{-6 \le x \le 3\}$ Range: $\{-5 \le y \le -1\}$ Function: YES	_______ 17. Domain: $\{0 \le x \le 6\}$ Range: $\{0 \le y \le 7\}$ Function: YES	_______ 18. Domain: $\{-4 \le x \le 7\}$ Range: $\{-7 \le y \le -2\}$ Function: NO
_______ 19. Domain: $\{x \le 0\}$ Range: $\{y \ge 0\}$ Function: YES	_______ 20. Domain: $\{2 \le x \le 7\}$ Range: $\{1 \le x \le 6\}$ Function: NO	_______21. Domain: $\{0 \le x \le 4\}$ Range: $\{0 \le y \le 6\}$ Function: YES
_______ 22. Domain: $\{-4 < x < 5\}$ Range: $\{-2 \le y < 5\}$ Function: YES	_______ 23. Domain: $\{x \le 5\}$ Range: $\{y = 0\}$ Function: YES	_______ 24. Domain: $\{-7 < x < 0\}$ Range: $\{-3 < y < 4\}$ Function: YES

USE THESE GRAPHS TO ANSWER QUESTIONS 1 – 12.

A



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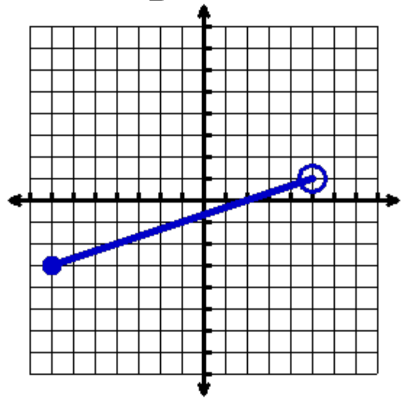

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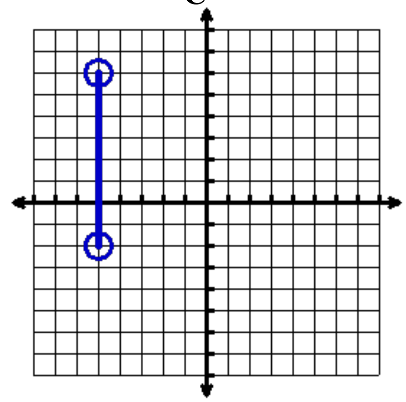

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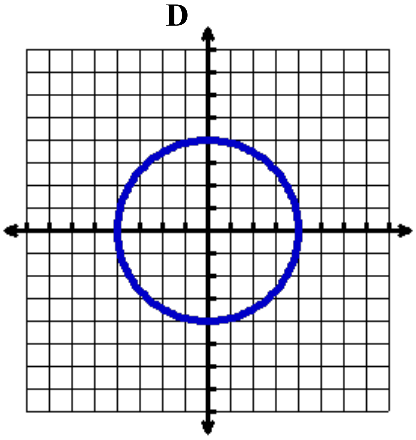

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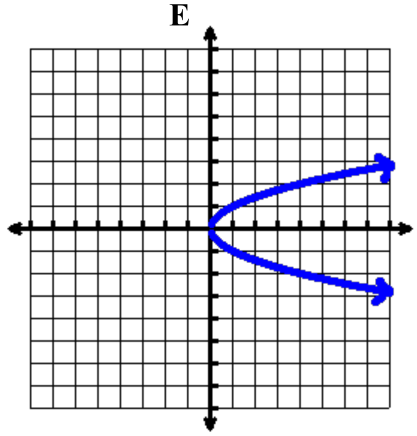

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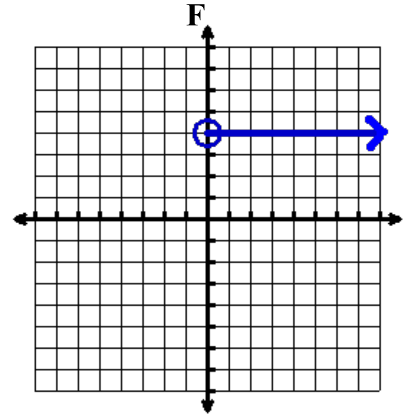

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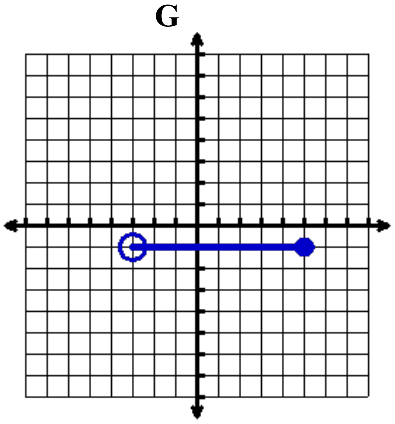

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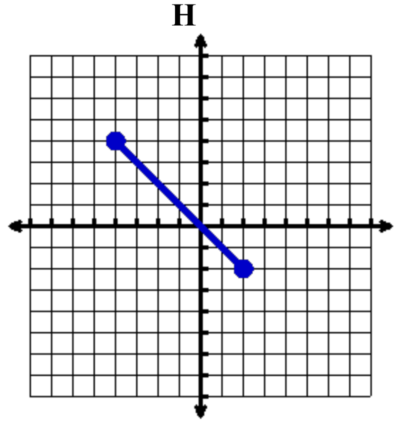

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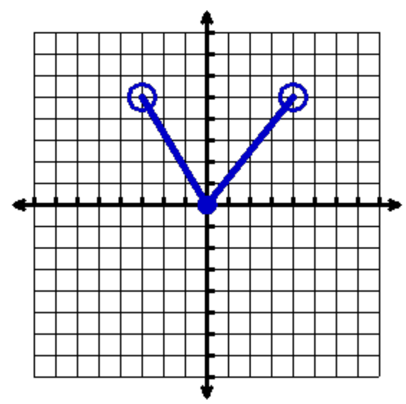

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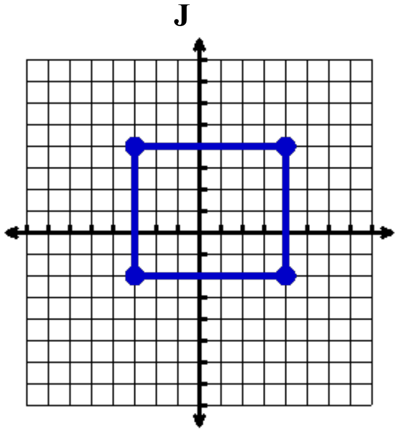

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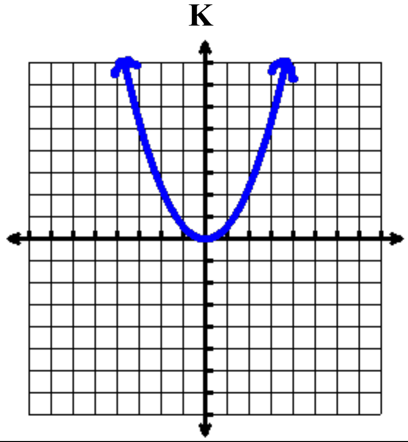

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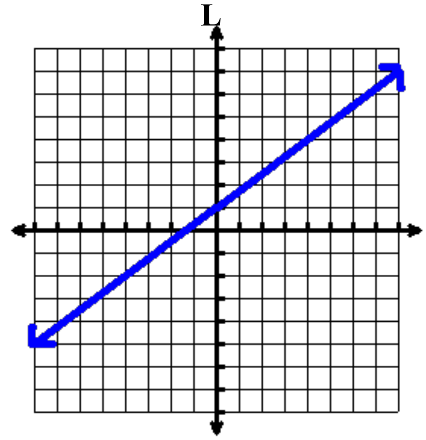
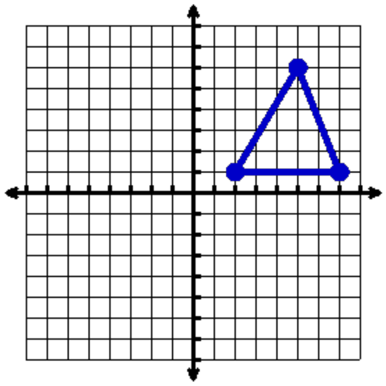


USE THESE GRAPHS TO ANSWER QUESTIONS 13 – 24.

M



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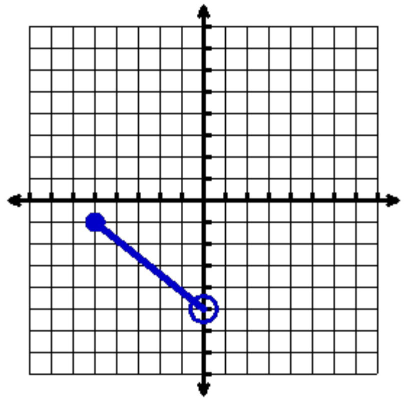

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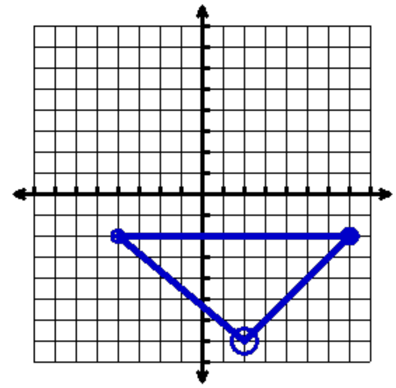

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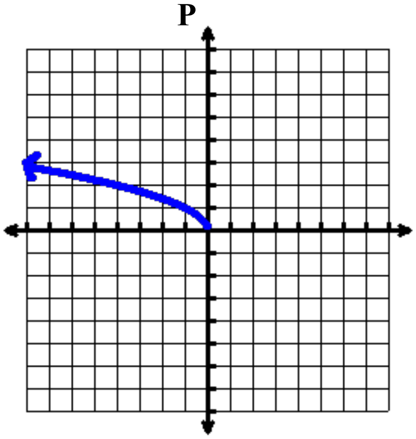

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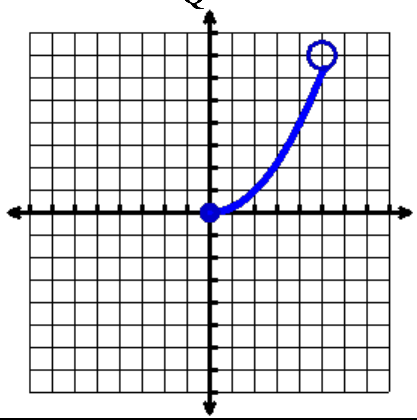

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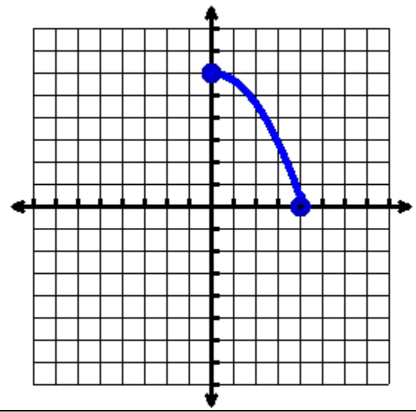

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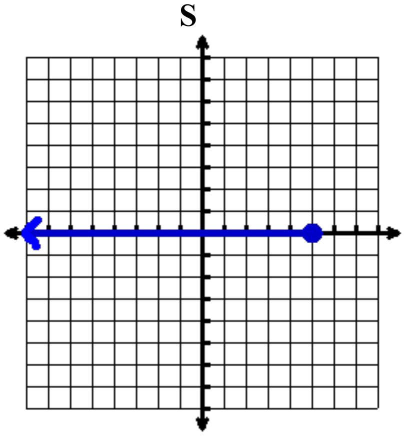

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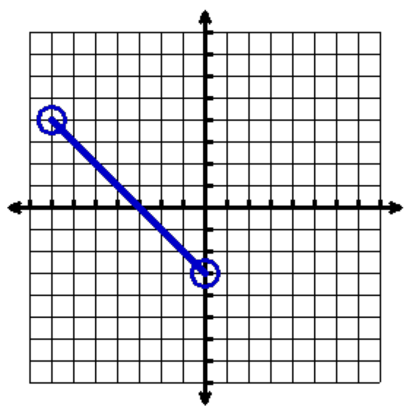

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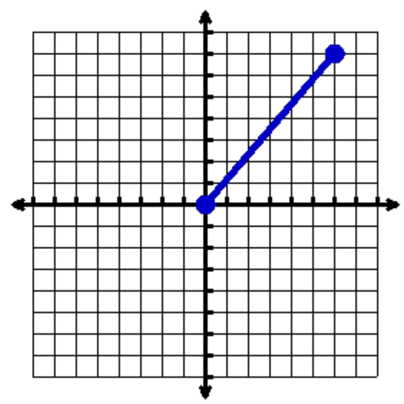

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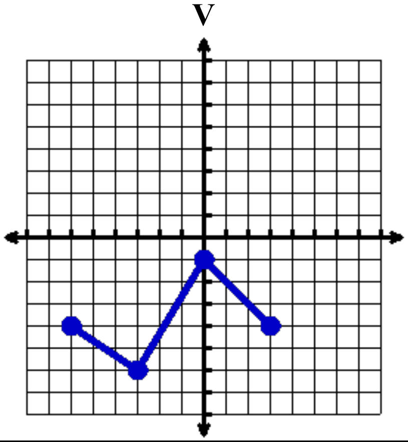

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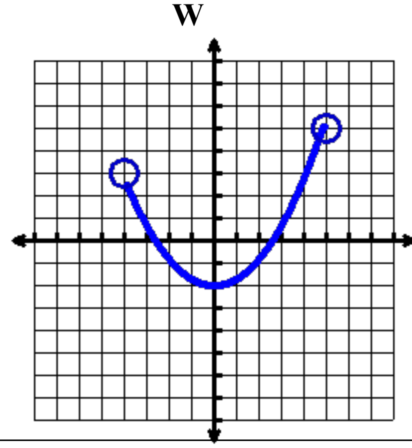

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