

Domain Detectives

Connect allowed inputs, endpoints, and real situations.

GRADE 8 • 8.FGR.5.3

8.FGR.5.3 "Relate the domain of a linear function to its graph and where applicable to the quantitative relationship it describes."

NAME _____

DATE _____

CONNECT THE REPRESENTATIONS

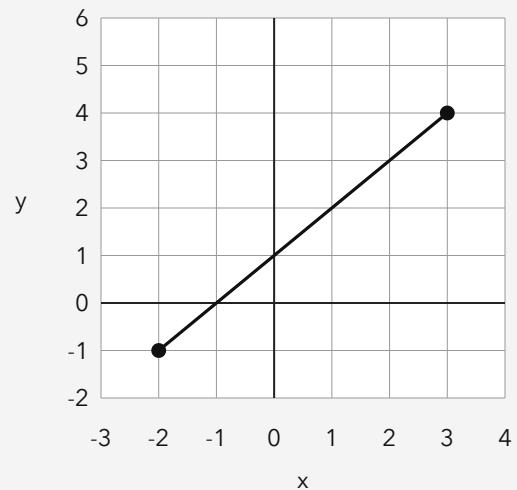
The domain is the set of allowed input values. Read the horizontal extent of a graph. A filled endpoint includes its input; an open endpoint excludes it. Context can restrict a linear rule to a continuous interval or separate whole-number inputs.

WORKED EXAMPLE

Read the domain of this complete line segment.

1. The left endpoint has $x = -2$ and is filled.
2. The right endpoint has $x = 3$ and is filled.
3. Include every x -value between them.

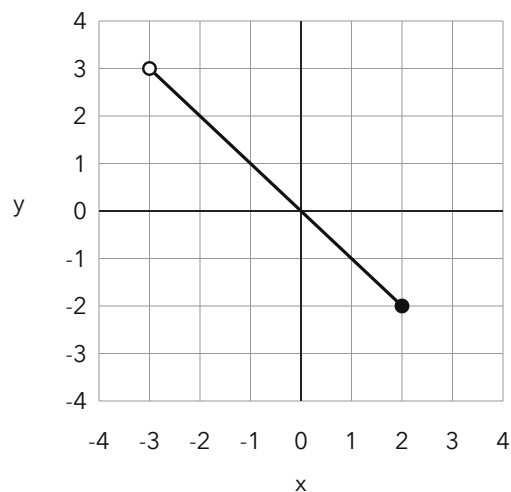
Answer: $-2 \leq x \leq 3$.



PRACTICE 4 problems

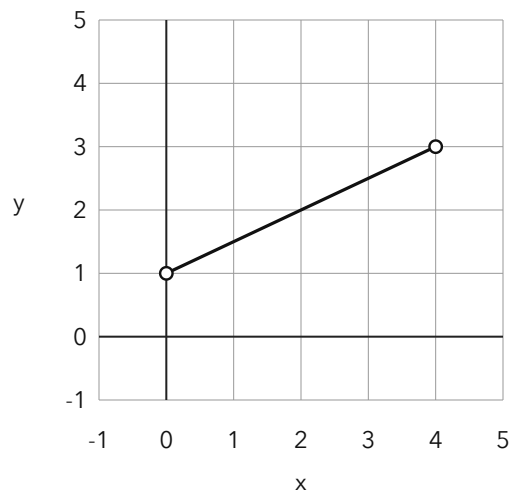
- 1** This is the complete graph. State its domain and explain the endpoint choices.

ANSWER _____



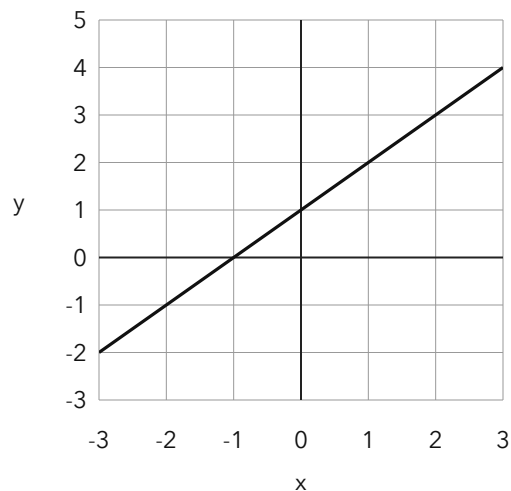
- 2** This is the complete graph. State the domain. Is $x = 0$ allowed? Is $x = 4$ allowed?

ANSWER _____



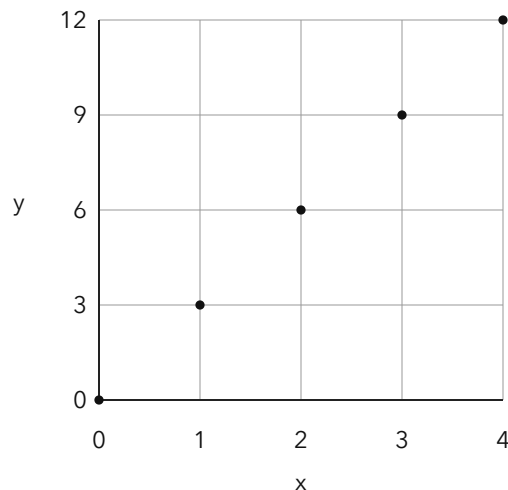
- 3** This window shows part of $y = x + 1$. The line continues beyond the window in both directions without endpoints. State the domain. Does the window limit it?

ANSWER _____



- 4** The graph shows all allowed purchases: x tickets and y dollars. State its domain. Explain why $x = 2.5$ is excluded even though it lies between 0 and 4.

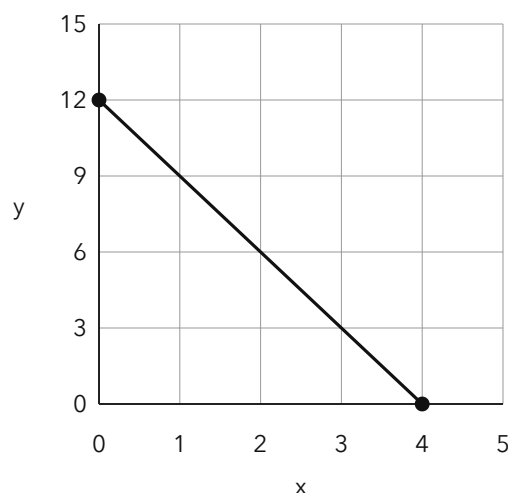
ANSWER _____



APPLY IT Show your work

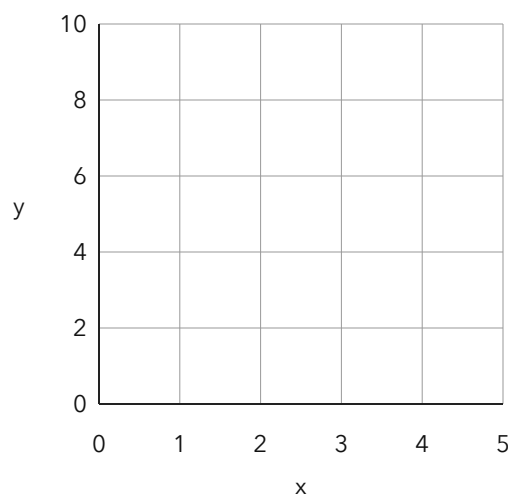
- 1** A tank has 12 liters and drains at 3 liters per minute until empty. x is minutes, y is liters. The complete graph is shown. Give the domain and explain both endpoints. Is $x = 1.5$ allowed?

REASONING AND ANSWER



- 2** A club orders 1 through 4 whole kits at \$2 per kit. Here x is kits and y is dollars. Graph all allowed orders and state the domain. Explain why the graph is not a connected segment.

REASONING AND ANSWER



CHALLENGE One step up

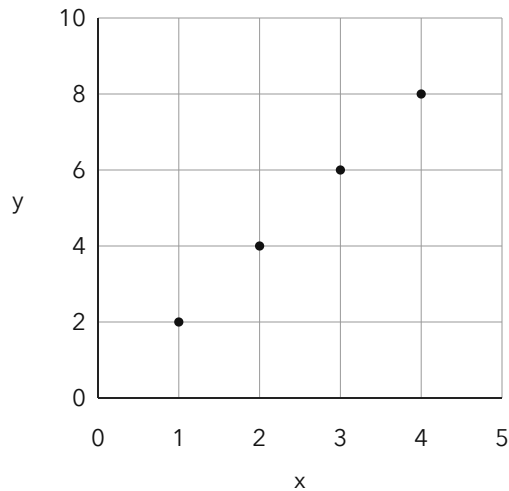
A student says this complete graph has domain all real numbers because its rule is linear. Correct the claim. Is input 2 allowed? Explain what would change if the right endpoint were filled.

WORK SPACE AND ANSWER



APPLY IT 2

Points (1, 2), (2, 4), (3, 6), (4, 8). Domain {1, 2, 3, 4}. Fractional kits and zero-kit orders are not allowed. Evaluate $y = 2x$ at each allowed whole-number input; do not connect the dots.

**PRACTICE 1**

$-3 < x \leq 2$. The left endpoint is open and the right endpoint is filled.

PRACTICE 2

$0 < x < 4$; neither 0 nor 4 is allowed.

PRACTICE 3

All real numbers. A viewing window does not restrict this unrestricted function.

PRACTICE 4

{0, 1, 2, 3, 4}. Tickets are whole objects; only the five plotted inputs are allowed.

APPLY IT 1

$0 \leq x \leq 4$ minutes. Start at $x = 0$; empty at $x = 4$. Yes, 1.5 minutes is allowed in this continuous interval. Solve $12 - 3x = 0$ to get 4. Time can include fractions.

CHALLENGE

Domain $-2 \leq x < 2$. Input 2 is excluded. Filling the right endpoint would give $-2 \leq x \leq 2$; the linear rule alone does not determine its contextual restriction.

Accept interval notation or equivalent inequalities. Task 3 explicitly shows a viewing window of an unrestricted line; no finite boundary dots appear there. Discrete domains must list only permitted whole-number inputs.