LESSON MAKER PRO

Graph Clues

Find what parent-function graphs reveal.

HIGH SCHOOL · A3.A.8

A3.A.8 "Determine characteristics of graphs of parent functions (domain/range, increasing/decreasing intervals, intercepts, symmetry, end behavior, and asymptotic behavior)."

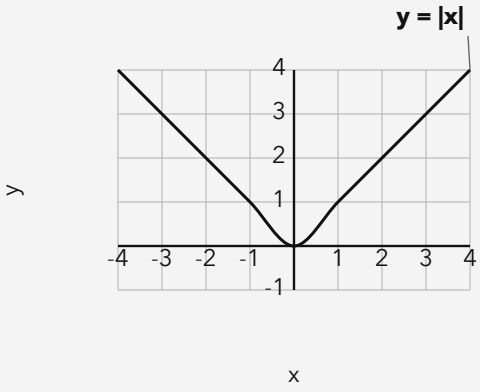
NAME _____ DATE _____

READ THE GRAPH

Domain is the set of x-values a graph uses, and range is the set of y-values it reaches. Read from left to right to find where a graph rises or falls. An asymptote is a line that a graph approaches.

WORKED EXAMPLE

Use the graph to find the range and the interval where the function increases.



1. The lowest point has y = 0.
2. The graph reaches every y-value above 0, so the range is [0, ∞).
3. To the right of x = 0, the graph rises.

Answer: Range: [0, ∞); increasing on (0, ∞).

PRACTICE 4 problems

1 For $y = x^2$, give the domain and range.

ANSWER _____

2 For $y = x^3$, give the interval where it increases and its y-intercept.

ANSWER _____

3 For $y = 1/x$, give the vertical and horizontal asymptotes.

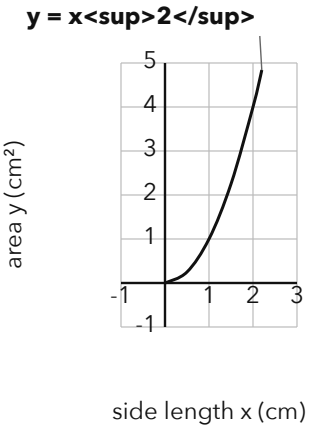
ANSWER _____

4 For $y = \sqrt{x}$, give the domain and x-intercept.

ANSWER _____

APPLY IT Show your work

1 A designer models the area y of a square poster using its side length x, starting at x = 0. Use the graph to give the model's domain and range.



side length x (cm)

ANSWER _____

2 In a game, a character climbs a ramp. The graph models height y at horizontal distance x. At what distance is the height 2 m? Is the height increasing or decreasing?



distance x (m)

ANSWER _____

CHALLENGE One step up

Compare $y = x^2$ and $y = 1/x$ as x grows without bound. Which output grows without bound? Which approaches a horizontal asymptote? Name it.

WORK SPACE AND ANSWER

ANSWER KEY

Graph Clues

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	For $y = x^2$, give the domain and range.	**Domain: all real numbers; range: [0, ∞).**
2	For $y = x^3$, give the interval where it increases and its y-intercept.	**Increasing on all real numbers; y-intercept: (0, 0).**
3	For $y = 1/x$, give the vertical and horizontal asymptotes.	**Vertical: x = 0; horizontal: y = 0.**
4	For $y = \sqrt{x}$, give the domain and x-intercept.	**Domain: [0, ∞); x-intercept: (0, 0).**

PART 2 · APPLY IT

1. **Domain: [0, ∞) cm; range: [0, ∞) cm².** Side length starts at zero and can increase without bound. The graphed area also starts at zero and increases without bound.
2. **The height is 2 m at x = 4 m; it is increasing.** Read across from y = 2 to the curve, then down to x = 4. The curve rises from left to right.

CHALLENGE

For $y = x^2$, the output grows without bound. For $y = 1/x$, the output approaches the horizontal asymptote y = 0.

Accept interval notation or equivalent inequalities. Accept "increasing for every real x" for the cubic function.