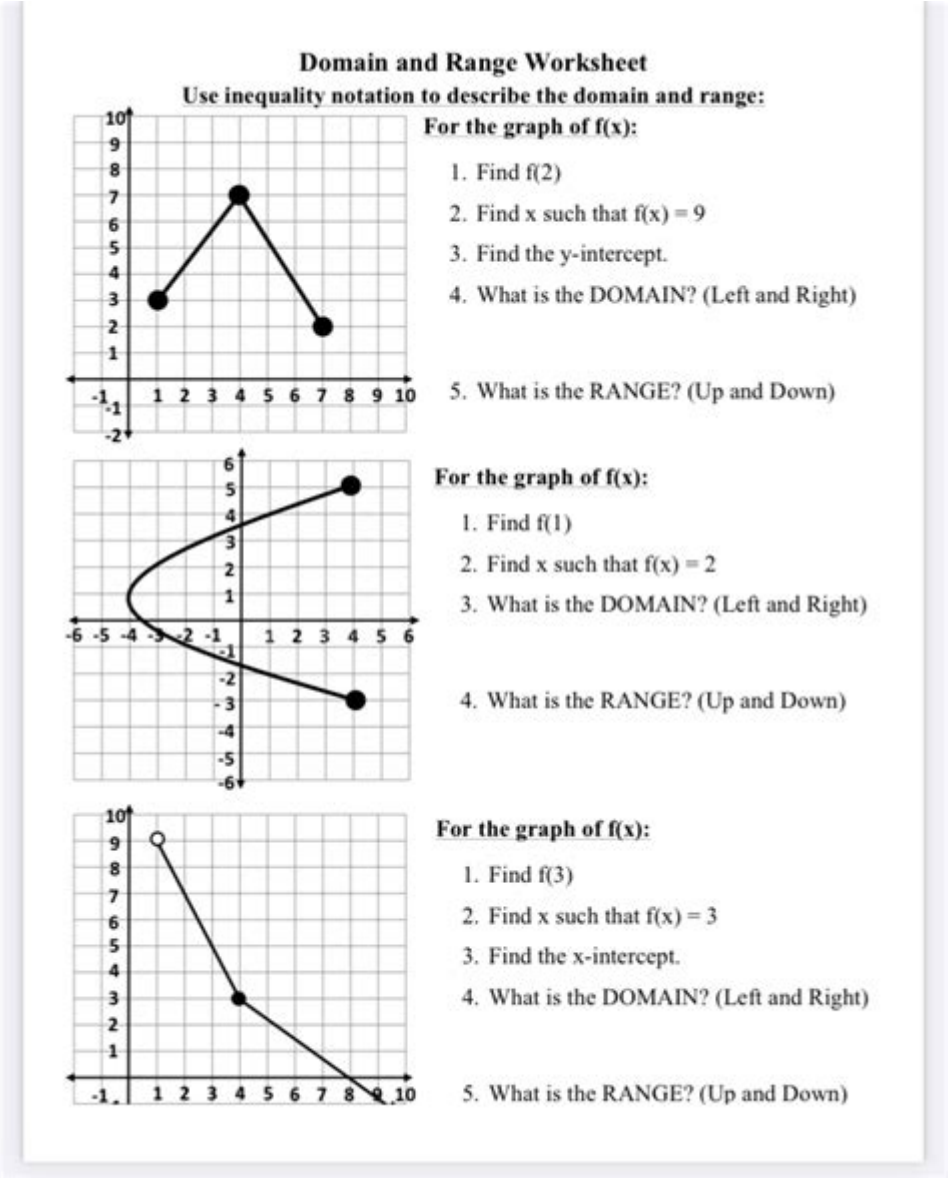
Domain And Range Interval Notation Worksheet With Answers



Domain and Range Worksheet

Use inequality notation to describe the domain and range:

For the graph of f(x):

1. Find f(2)
2. Find x such that f(x) = 9
3. Find the y-intercept.
4. What is the DOMAIN? (Left and Right)
5. What is the RANGE? (Up and Down)

For the graph of f(x):

1. Find f(1)
2. Find x such that f(x) = 2
3. What is the DOMAIN? (Left and Right)
4. What is the RANGE? (Up and Down)

For the graph of f(x):

1. Find f(3)
2. Find x such that f(x) = 3
3. Find the x-intercept.
4. What is the DOMAIN? (Left and Right)
5. What is the RANGE? (Up and Down)

Understanding Domain and Range in Interval Notation

Domain and range interval notation worksheet with answers is an essential tool for students and educators alike, providing a structured approach to understanding and practicing the concepts of domain and range in mathematics. By using interval notation, students can express the set of possible input values (domain) and output values (range) for functions more succinctly. This article delves into domain and range, explains how to write them in interval notation, provides a worksheet with practice problems, and includes answers for self-assessment.

What are Domain and Range?

In mathematics, particularly in functions, the concepts of domain and range are fundamental:

Domain

The domain of a function is the complete set of possible values of the independent variable (often denoted as x) that will not cause any mathematical issues such as division by zero or taking the square root of a negative number.

Range

The range of a function is the complete set of possible values of the dependent variable (often denoted as y) that result from the domain values being input into the function.

Understanding these concepts is crucial for graphing functions and interpreting their behavior.

Interval Notation Explained

Interval notation is a mathematical notation used to represent a range of values. It employs parentheses and brackets to indicate whether endpoints are included or excluded:

- **(a, b)** - This notation indicates that the interval includes all numbers between a and b, excluding a and b themselves (open interval).
- **[a, b]** - This indicates that the interval includes all numbers between a and b, including both a and b (closed interval).
- **(a, b]** - This means that the interval includes all numbers between a and b, excluding a but including b (half-open or half-closed interval).
- **[a, b)** - This means that the interval includes all numbers between a and b, including a but excluding b (half-open or half-closed interval).

Worksheet: Domain and Range Problems

The following worksheet contains a variety of functions for which students can determine the domain and range using interval notation. The problems vary in complexity to cater to different skill levels.

1. Determine the domain and range of the function:

f(x) = 1/(x-3)

2. Determine the domain and range of the function:
   g(x) = √(x + 4)

3. Determine the domain and range of the function:
   h(x) = x^2 - 1

4. Determine the domain and range of the function:
   j(x) = |x - 2|

5. Determine the domain and range of the function:
   k(x) = x^3 - 3x + 2

Answers to the Domain and Range Worksheet

Now that you have attempted the problems, here are the answers for self-assessment:

1. **f(x) = 1/(x-3)**
   - Domain: **(−∞, 3) ∪ (3, ∞)**
   - Range: **(−∞, 0) ∪ (0, ∞)**

2. **g(x) = √(x + 4)**
   - Domain: **[−4, ∞)**
   - Range: **[0, ∞)**

3. **h(x) = x^2 - 1**
   - Domain: **(−∞, ∞)**
   - Range: **[−1, ∞)**

4. **j(x) = |x - 2|**
   - Domain: **(−∞, ∞)**

- Range: **[0, ∞)**

5. **k(x) = x^3 - 3x + 2**
    - Domain: **(−∞, ∞)**
    - Range: **(−∞, ∞)**

Conclusion

The ability to determine the domain and range of a function and express these sets in interval notation is a critical skill in algebra and calculus. The provided worksheet and answers offer a practical way for learners to engage with these concepts and assess their understanding.

Practicing with a variety of functions enhances comprehension and prepares students for more advanced mathematical concepts. Regular practice can build confidence and proficiency in identifying domain and range, fostering a deeper understanding of function behavior.

As students continue to work with functions, they will find that mastering domain and range in interval notation becomes an invaluable part of their mathematical toolkit.

Frequently Asked Questions

What is the purpose of a domain and range interval notation worksheet?

The purpose is to help students understand how to identify and express the domain and range of functions using interval notation.

How do you express the domain of the function f(x) = √(x - 2)?

The domain is expressed in interval notation as [2, ∞).

What interval notation represents the range of the function g(x) = -x^2?

The range of g(x) = -x^2 is expressed as (-∞, 0].

What does an open interval, such as (2, 5), indicate about the endpoints?

An open interval means that the endpoints 2 and 5 are not included in the set of values.

How would you write the domain of the function h(x) = 1/(x - 3) in interval notation?

The domain is written as (-∞, 3) ∪ (3, ∞), indicating that x cannot be 3.

What is the difference between closed and open intervals?

Closed intervals include their endpoints, denoted by square brackets [ ], while open intervals do not include their endpoints, denoted by parentheses ( ).

How can you determine the range of a linear function like f(x) = 2x + 3?

The range of a linear function is all real numbers, expressed as (-∞, ∞).

What is the interval notation for the domain of the function k(x) = |x|?

The domain of k(x) = |x| is all real numbers, written as (-∞, ∞).

What does the expression [a, b) mean in interval notation?

[a, b) indicates a closed interval at a and an open interval at b, meaning a is included and b is not.

Domain And Range Interval Notation Worksheet With Answers

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一级域名是什么意思 一级域名指的是域名中最右边的部分，也就是顶级域名 (TLD，Top-Level Domain)，如.com、.cn、.org等。一级域名由国际互联网域名分配机构 (ICANN)进行管理， ...

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