

Topic: Domain and range

Question: What are the domain and range of the function defined by the set of coordinate points?

$(3,4), (4,1), (5,2), (7,1)$

Answer choices:

- | | | |
|---|---------------------------|-----------------------|
| A | The domain is 3, 4, 5, 7. | The range is 1, 2, 4. |
| B | The domain is 3, 7. | The range is 1, 4. |
| C | The domain is 3, 4, 5, 7. | The range is 1, 2. |
| D | None of these | |



Solution: A

Remember that the coordinates of points in the Cartesian coordinate system are given in the form (x, y) .

Since the domain of a function is all of the x -values, we can see that the domain of this function is

3, 4, 5, 7

The range of a function is all of the y -values, so we can see that the range of this function is

4, 1, 2, 1

We don't need to include the same value more than once, so we'll list 1 only once, and rearrange the numbers so that they're in ascending order. The range is

1, 2, 4



Topic: Domain and range**Question:** What are the domain and range of the function?

$$y = \frac{2}{x}$$

Answer choices:

- A Domain: all real numbers except 2 Range: all real numbers except 2
- B Domain: all real numbers except 0 Range: all real numbers except 0
- C Domain: all real numbers except 0 Range: all real numbers except 2
- D Domain: all real numbers except 2 Range: all real numbers except 0



Solution: B

The domain of a function is all of the x -values for which the function is defined. The range of a function is all of the y -values that correspond to the x -values in the domain.

To solve for the domain of a function, we look for any values where the function is not defined. The function $y = 2/x$ is undefined for $x = 0$, because division by 0 is undefined. However, this function is defined for all other values of x , so its domain consists of all real numbers except 0.

To find the range, we need to look for the y -values that correspond to values in the domain and for those that don't.

For every nonzero real number y , there's some nonzero real number x such that

$$y = \frac{2}{x}$$

To see this, multiply both sides of this equation by x/y .

$$y \left(\frac{x}{y} \right) = \left(\frac{2}{x} \right) \left(\frac{x}{y} \right)$$

$$x = \frac{2}{y}$$

So for any nonzero real number y , we divide 2 by y to get a nonzero real number x for which $y = 2/x$. However, there's no nonzero real number x such that



$$0 = \frac{2}{x}$$

To see this, multiply both sides of this equation by x .

$$0(x) = \left(\frac{2}{x}\right)(x)$$

$$0 = 2$$

This gives us the false equation $0 = 2$.

Combining these results, we find that the range of this function is all real numbers except 0.



Topic: Domain and range**Question:** What is the domain of the function?

$$f(x) = \sqrt{4x^3}$$

Answer choices:

- A The domain is all values of x that make $4x^3$ positive
- B The domain is all values of x that make $4x^3$ negative
- C The domain is all values of x that make $4x^3$ either 0 or positive
- D The domain is all values of x that make $4x^3$ either 0 or negative



Solution: C

When we're dealing with real numbers, we can only take the square root of 0 or positive values.

In other words, we won't be able to find the square root of $4x^3$ unless the value of $4x^3$ is positive, or equal to 0.

Therefore, any values of x that make $4x^3$ equivalent to 0, or equivalent to any positive value, will be included in the domain of the function.

