

## INTERVALS OF THE REAL LINE

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Print your **full name** and **three digit section number** in the top right corner.

- A **function** is a rule  $f$  that assigns to each element of some set  $A$  an element of some other set  $B$ .
  - We write  $f: A \rightarrow B$  to display all the ingredients together.
  - The set  $A$  is called the **domain** of  $f$ .
1. arcsin assigns elements of the set  $[-1, 1]$  to the set  $[0, \pi]$ 
    - (A)  $[-1, 1] \rightarrow [0, \pi]$
    - (B)  $[-1, 1] \rightarrow [-\frac{\pi}{2}, \frac{\pi}{2}]$
    - (C)  $[-\frac{\pi}{2}, \frac{\pi}{2}] \rightarrow [-1, 1]$
    - (D) All of the above
    - (E) None of the above
  2. arccos assigns elements of the set  $[-1, 1]$  to the set  $[0, \pi]$ 
    - (A)  $[-1, 1] \rightarrow [0, \pi]$
    - (B)  $[-1, 1] \rightarrow [-\frac{\pi}{2}, \frac{\pi}{2}]$
    - (C)  $[-\frac{\pi}{2}, \frac{\pi}{2}] \rightarrow [-1, 1]$
    - (D) All of the above
    - (E) None of the above
  3. arctan assigns elements of the set  $\mathbf{R}$  to the set  $(-\frac{\pi}{2}, \frac{\pi}{2})$ 
    - (A)  $\mathbf{R} \rightarrow (-1, 1)$
    - (B)  $(-\frac{\pi}{2}, \frac{\pi}{2}) \rightarrow \mathbf{R}$
    - (C)  $\mathbf{R} \rightarrow (-\frac{\pi}{2}, \frac{\pi}{2})$
    - (D) All of the above
    - (E) None of the above
- A subset of  $\mathbf{R}$  is **closed** if it “contains its boundary.”
4. Which of the following intervals are closed?
    - (A) the domain of arctan
    - (B) the domain of arcsin
    - (C)  $[-1, 1] = \{x : -1 \leq x \leq 1\}$
    - (D)  $(-1, 1) = \{x : -1 < x \leq 1\}$
    - (E) None of the above
- An **open interval**  $(a, b)$  is the set of numbers  $\{x : a < x < b\}$ .
  - A subset  $O$  of  $\mathbf{R}$  is **open** if for each point  $x \in O$ , there's an interval  $(a, b)$  that contains  $x$  and is contained in  $O$ .
5. The domain of arctan is open.
    - TRUE
    - FALSE

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Repo: <https://github.com/coltongrainger/fy19ta>.