

Topic: Common bases and restricted values**Question:** Which answer choice describes an equivalent value?

$$\log(1,000)$$

Answer choices:

- A $\log_{10}(1,000)$
- B 3
- C Both A and B
- D None of these



Solution: C

When a logarithm is written without a base, it implies that it's a "common logarithm," that is, a logarithm to base 10. Therefore,

$$\log(1,000)$$

can also be written as

$$\log_{10}(1,000)$$

Furthermore, we know from the general log rule that the value of $\log_{10}(1,000)$ is equal to the solution of the equation

$$10^x = 1,000$$

We know that $10^3 = 10 \cdot 10 \cdot 10 = 1,000$, which means that $x = 3$, so $\log(1,000) = 3$.



Topic: Common bases and restricted values**Question:** Which answer choice describes an equivalent value?

$$\log_e(x)$$

Answer choices:

- A $\ln(x)$
- B The natural log of x
- C Both A and B
- D None of these



Solution: C

Logarithms to base e are called “natural logarithms” or “natural logs.” Because this is a special base, we write it differently, saying that

$$\log_e(x) = \ln(x)$$



Topic: Common bases and restricted values

Question: Which is true about the base of a logarithm?

Answer choices:

- A The base cannot be negative.
- B The base cannot be 0.
- C The base cannot be 1.
- D All of the above



Solution: D

The base of a logarithm must be positive and not equal to 1. The reason is that if the base is negative, 0, or 1, it could cause us to wind up with an invalid equation.

