Topic: Idea of the limit

Question: Find the limit using the table of function values.

$$\lim_{x \to 0} \frac{\sec x - 1}{x}$$

x	-0.1	-0.01	-0.001	0.001	0.01	0.1
$\dfrac{\sec x - 1}{x}$	-0.0502	-0.0050	-0.0005	0.0005	0.0050	0.0502

Answer choices:

A 0

B 0.00005

C -0.0001

D -0.00005

Solution: A

The limit as x approaches 0 of

$$f(x) = \frac{\sec x - 1}{x}$$

is 0, because we can see from the table that the function values are getting smaller and smaller as x approaches 0 from both the left-hand side and the right-hand side.

Topic: Idea of the limit

Question: What does the given limit mean?

$$\lim_{x \to 3} x^2 - 1 = 8$$

Answer choices:

A The limit as x approaches 8 of the function $f(x) = x^2 - 1$ is equal to 3.

B The limit as x approaches 3 of the function $f(x) = x^2 - 1$ is not equal to 8.

C The limit as x approaches 8 of the function $f(x) = x^2 - 1$ is not equal to 3.

D The limit as x approaches 3 of the function $f(x) = x^2 - 1$ is equal to 8.

Solution: D

Limits are written as

$$\lim_{x \to a} f(x) = b$$

where a is the value that x is approaching, $f(x)$ is the given function and b is the solution.

To solve, we need to read the limit

$$\lim_{x \to 3} x^2 - 1 = 8$$

This means that we need to break it down into its components.

- First, the limit as x approaches 3.
- Then, the function $f(x) = x^2 - 1$.
- Finally, the limit of the function as x approaches 3 is equal to 8.

We can put that all together as answer choice D:

The limit as x approaches 3 of the function $f(x) = x^2 - 1$ is equal to 8.

Topic: Idea of the limit

Question: What does the limit mean?

$$\lim_{x \to \infty} -x^2 + 4 = -\infty$$

Answer choices:

A The limit as x approaches $-\infty$ of the function $f(x) = -x^2 + 4$ is equal to ∞.

B The limit as x approaches ∞ of the function $f(x) = -x^2 + 4$ is equal to $-\infty$.

C The limit as x approaches $-\infty$ of the function $f(x) = -x^2 + 4$ is not equal to ∞.

D The limit as x approaches ∞ of the function $f(x) = -x^2 + 4$ is not equal to $-\infty$.

Solution: B

Limits are written as

$$\lim_{x \to a} f(x) = b$$

where a is the value that x is approaching, $f(x)$ is the given function and b is the solution.

To solve, we need to read the limit

$$\lim_{x \to \infty} -x^2 + 4 = -\infty$$

This means that we need to break it down into its components.

- First, the limit as x approaches ∞.
- Then, the function $f(x) = -x^2 + 4$.
- Finally, the limit of the function as x approaches 3 is equal to $-\infty$.

We can put that all together as answer choice B:

The limit as x approaches ∞ of the function $f(x) = -x^2 + 4$ is equal to $-\infty$.