Topic: Idea of the limit

Question: What statement is being made by the limit equation?

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

Answer choices:

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

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

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

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

Solution: D

Break down the limit

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

into its component parts:

- x approaches 3
- the function is $f(x) = x^2 - 1$
- the value of the limit is 8

Putting these pieces together gives a full statement of the limit:

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

Topic: Idea of the limit

Question: Use limit notation to write the limit of the function $f(x)$ as x approaches 3.

$$f(x) = \frac{x-6}{x}$$

Answer choices:

A $\lim_{x \to -3} f(x) = \frac{x-6}{x}$

B $\lim_{x \to 3} f(x) = \frac{x-6}{x}$

C $\lim_{x \to 3} \frac{x-6}{x}$

D $\lim_{x \to -3} \frac{x-6}{x}$

Solution: C

When a is the value that x approaches, and $f(x)$ is the given function, the limit is written as

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

In this case, x approaches 3, so $a = 3$, and the function is

$$f(x) = \frac{x - 6}{x}$$

So we'd write the limit as

$$\lim_{x \to 3} \frac{x - 6}{x}$$

Topic: Idea of the limit

Question: Evaluate the limit.

$$\lim_{x \to 3} \frac{x-6}{x}$$

Answer choices:

A -3

B 3

C -1

D 1

Solution: C

To evaluate the limit,

$$\lim_{x \to 3} \frac{x-6}{x}$$

plug the value that's being approached into the function, then simplify the answer.

$$\frac{3-6}{3}$$

$$\frac{-3}{3}$$

$$-1$$