

**Topic:** Idea of the limit

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

$$\lim_{x \rightarrow 3} (x^2 - 1) = 8$$

**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

$$\lim_{x \rightarrow 3} (x^2 - 1) = 8$$

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

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

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

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



**Solution: C**

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

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

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

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



**Topic:** Idea of the limit

**Question:** Evaluate the limit.

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

**Answer choices:**

A      $-3$

B      $3$

C      $-1$

D      $1$



**Solution: C**

To evaluate the limit,

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

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

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

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

$$-1$$

