

**Topic:** Even, odd, or neither

**Question:** Is the function even, odd, or neither?

$$f(x) = 2x^3 - x^7$$

**Answer choices:**

- A Even
- B Odd
- C Neither



**Solution: B**

A function is even if  $f(x) = f(-x)$ , odd if  $f(-x) = -f(x)$ , and neither if  $f(-x) \neq f(x)$  and  $f(-x) \neq -f(x)$ . So to classify the given function, we'll substitute  $-x$  into the expression for the function and then simplify the result.

Given

$$f(x) = 2x^3 - x^7$$

we get

$$f(-x) = 2(-x)^3 - (-x)^7$$

$$f(-x) = 2(-1x)^3 - (-1x)^7$$

$$f(-x) = 2(-1)^3(x^3) - (-1)^7(x^7)$$

$$f(-x) = 2(-1)x^3 - (-1)x^7$$

$$f(-x) = -2x^3 + x^7$$

$$f(-x) = -(2x^3 - x^7)$$

This function is odd, because  $f(-x) = -f(x)$ .



**Topic:** Even, odd, or neither

**Question:** Is the function even, odd, or neither?

$$f(x) = 5x^2 - 2x^3$$

**Answer choices:**

- A Even
- B Odd
- C Neither



**Solution: C**

A function is even if  $f(x) = f(-x)$ , odd if  $f(-x) = -f(x)$ , and neither if  $f(-x) \neq f(x)$  and  $f(-x) \neq -f(x)$ . So to classify the given function, we'll substitute  $-x$  into the expression for the function and then simplify the result.

Given

$$f(x) = 5x^2 - 2x^3$$

we get

$$f(-x) = 5(-x)^2 - 2(-x)^3$$

$$f(-x) = 5(-1x)^2 - 2(-1x)^3$$

$$f(-x) = 5(-1)^2(x^2) - 2(-1)^3(x^3)$$

$$f(-x) = 5(1)x^2 - 2(-1)x^3$$

$$f(-x) = 5x^2 + 2x^3$$

This function is neither even nor odd, because  $f(-x) \neq f(x)$  and  $f(-x) \neq -f(x)$ .



**Topic:** Even, odd, or neither

**Question:** Is the function even, odd, or neither?

$$f(x) = -x^4 - 6x^2$$

**Answer choices:**

- A Even
- B Odd
- C Neither



**Solution: A**

A function is even if  $f(x) = f(-x)$ , odd if  $f(-x) = -f(x)$ , and neither if  $f(-x) \neq f(x)$  and  $f(-x) \neq -f(x)$ . So to classify the given function, we'll substitute  $-x$  into the expression for the function and then simplify the result.

Given

$$f(x) = -x^4 - 6x^2$$

we get

$$f(-x) = -(-x)^4 - 6(-x)^2$$

$$f(-x) = -(-1x)^4 - 6(-1x)^2$$

$$f(-x) = -(-1)^4(x^4) - 6(-1)^2(x^2)$$

$$f(-x) = -(1)x^4 - 6(1)x^2$$

$$f(-x) = -x^4 - 6x^2$$

This function is even, because  $f(x) = f(-x)$ .

