

## Lesson 3 Problem 2a Solution

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**Problem 2.**

a) Let us go through the functions:

1)  $f(x) = x \cdot |x|$ . We will show that this is odd, using the central property of the absolute value  $|x| = |-x|$ :

$$f(-x) = -x \cdot |-x| = -x \cdot |x| = -f(x)$$

2)  $f(x) = |x + 1| - |x - 1|$ . This is also odd:

$$f(-x) = |-x + 1| - |-x - 1| = |x - 1| - |x + 1| = -f(x)$$

3)  $f(x) = |x + 1| + |x - 1|$ . This is even:

$$f(-x) = |-x + 1| + |-x - 1| = |x - 1| + |x + 1| = f(x)$$

4)  $f(x) = 3x - x^2$ . This is neither odd nor even. Indeed,  $f(1) = 2$  and  $f(-1) = -4$ , which means that  $f(-x) \neq f(x)$  and  $f(-x) \neq -f(x)$  at least at  $x = 1$ .