

Exercise 31

For the following exercises, evaluate f at the indicated values $f(-3)$, $f(2)$, $f(-a)$, $-f(a)$, $f(a+h)$.

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

Solution

Evaluate the function at each of the given numbers.

$$\begin{aligned} f(-3) &= |(-3) - 1| - |(-3) + 1| \\ &= |-4| - |-2| \\ &= 4 - 2 \\ &= 2 \end{aligned}$$

$$\begin{aligned} f(2) &= |(2) - 1| - |(2) + 1| \\ &= |1| - |3| \\ &= 1 - 3 \\ &= -2 \end{aligned}$$

$$\begin{aligned} f(-a) &= |(-a) - 1| - |(-a) + 1| \\ &= |-a - 1| - |-a + 1| \\ &= |a + 1| - |a - 1| \end{aligned}$$

$$\begin{aligned} -f(a) &= -[|(a) - 1| - |(a) + 1|] \\ &= -(|a - 1| - |a + 1|) \\ &= -|a - 1| + |a + 1| \end{aligned}$$

$$\begin{aligned} f(a+h) &= |(a+h) - 1| - |(a+h) + 1| \\ &= |a+h-1| - |a+h+1| \end{aligned}$$