

## Exercise 58

If possible, find all values of  $a$  such that there are no  $x$ -intercepts for  $f(x) = 2|x + 1| + a$ .

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### Solution

To find the  $x$ -intercepts of the function, set  $f(x) = 0$  and solve the equation for  $x$ .

$$f(x) = 2|x + 1| + a = 0$$

Isolate the absolute value term. Subtract both sides by  $a$ .

$$2|x + 1| = -a$$

Divide both sides by 2.

$$|x + 1| = -\frac{a}{2}$$

For there to be no  $x$ -intercepts, no value of  $x$  can satisfy this equation. This can only occur if the right side is negative.

$$-\frac{a}{2} < 0$$

Solve for  $a$  by multiplying both sides by  $-2$ .

$$a > 0$$

Therefore, if  $a$  is a positive number, then  $f(x)$  will have no  $x$ -intercepts.