Exercise 26

For the following exercises, solve the equations over the complex numbers.

$$x^2 = -25$$

Solution

To solve for x, take the square root of both sides.

$$\sqrt{x^2} = \sqrt{-25}$$
$$= \sqrt{25(-1)}$$
$$= \sqrt{25}\sqrt{-1}$$
$$= 5i$$

Since there's an even power under an even root, and the result is to an odd power, an absolute value sign is needed around x.

$$|x| = 5i$$

Remove the absolute value sign by placing $\pm$ on the right side.

$$x = \pm 5i$$

Therefore, $x = \{-5i, 5i\}$.