Exercise 4

Verify that each of the two numbers $z = 1 \pm i$ satisfies the equation $z^2 - 2z + 2 = 0$.

Solution

Substitute the two numbers into the equation and check that the equation is satisfied. Check $z = 1 + i$ first.

$$(1 + i)^2 - 2(1 + i) + 2 \overset{?}{=} 0$$

$$1 + 2i + i^2 - 2 - 2i + 2 \overset{?}{=} 0$$

$$1 - 1 \overset{?}{=} 0$$

$$0 = 0$$

$z = 1 + i$ is indeed a solution of the equation. Check $z = 1 - i$ now.

$$(1 - i)^2 - 2(1 - i) + 2 \overset{?}{=} 0$$

$$1 - 2i + i^2 - 2 + 2i + 2 \overset{?}{=} 0$$

$$1 - 1 \overset{?}{=} 0$$

$$0 = 0$$

$z = 1 - i$ is indeed a solution of the equation, too.