

Solving by Squaring

Alfie Parkin

You might think that -4 and -1 are both solutions to this equation. Substituting in -4 gives:

$$\sqrt{-4 + 5} = -4 + 3$$

Which simplifies to:

$$\sqrt{1} = -1$$

This is true if you take into consideration the fact that square roots can be both positive and negative.

The second solution of -1 also works in a similar way. Subbing this value in gives:

$$\sqrt{-1 + 5} = -1 + 3$$

Which is equal to:

$$\sqrt{4} = 2$$

However, some may argue that -4 is not a solution because of logarithms. Taking any log of both sides of the equation gives:

$$\log(x + 5)^{\frac{1}{2}} = \log(x + 3)$$

The power-to-the-front rule simplifies the equation down to:

$$\frac{1}{2} \log(x + 5) = \log(x + 3)$$

Substituting -4 into the RHS gives this answer:

$$\log(-4 + 3) = \log(-1)$$

Logarithms with real number outputs are always positive therefore -4 is not a solution but -1 is.