Square Roots of Negative Numbers

CN02-V1 · storyboard · CN02 Square roots of negative numbers. Read each picture with its sentences.

Picture 1

Solve $x^2 = -36$.

$$x = \pm\sqrt{-36}$$ two square roots

$$= \pm\sqrt{36} \cdot \sqrt{-1} \quad \sqrt{-1} = i$$

$$\boxed{x = \pm 6i} \quad (6i)^2 = -36$$

1. Solve x squared equals negative 36.
2. Take the square root of both sides, and keep plus or minus.
3. Split off the negative 1: root 36, times root negative 1, which is i.
4. So x equals plus or minus 6 i.
5. Check: 6 i, squared, is 36 i squared, which is negative 36.

Picture 2

Solve $2y^2 = -40.$

$y^2 = -20$ divide by 2 first

$$\boxed{y = \pm i\sqrt{20} = \pm 2i\sqrt{5}}$$ $20 = 4 \times 5$

6. Solve 2 y squared equals negative 40.
7. Divide by 2 first: y squared is negative 20.
8. So y is plus or minus i root 20.
9. And 20 is 4 times 5, so that is plus or minus 2 i root 5.
10. Either form is right.

Picture 3

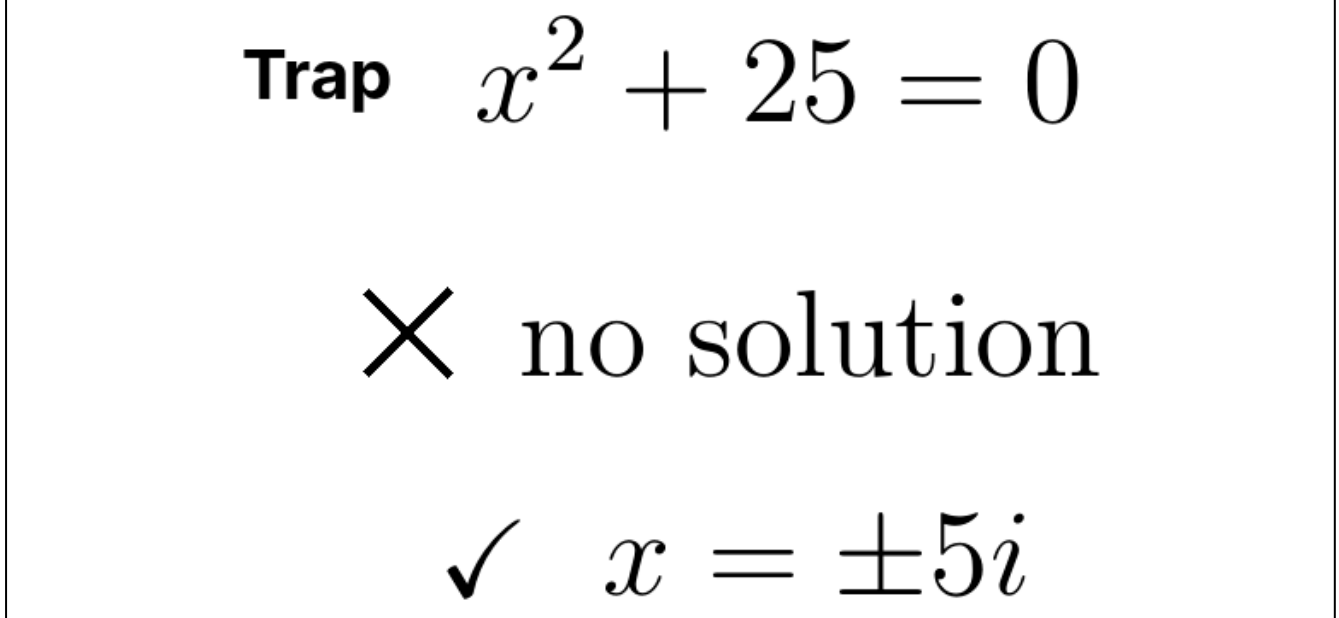
Trap $x^2 = -16$

$\times$ $x = \pm 4$

$\checkmark$ $x = \pm 4i$

11. Watch for the trap: x squared equals negative 16 does not give plus or minus 4, because 4 squared is positive 16.
12. Keep the i: plus or minus 4 i.

Picture 4



13. Another trap: x squared plus 25 equals 0 has no real solution, but it does have two imaginary ones: plus or minus 5 i.