A Check for Conceptual Understanding (ALG.CN.15)

Determine whether each statement is true or false. If it is false, identify why.

1. The sum of two complex numbers is always complex.
2. The product of two complex numbers is sometimes complex.
3. The sum of two imaginary numbers is always imaginary.
4. There is no complex number that is equal to its complex conjugate.
5. $\left(\sqrt{-4}\right)\left(\sqrt{-8}\right) = 4\sqrt{2}$
6. All real numbers are imaginary numbers.
7. All real numbers are complex numbers.
8. All imaginary numbers are complex numbers.
9. A rational number is a complex number.
10. Every complex number is a real number.
11. π is a complex number.
12. The real part of $\boldsymbol{12i}$ is $\mathbf{0}$.
13. The square root of a negative number is an imaginary number.
14. The product of a complex number and its complex conjugate is always a real number.
15. $i^{40} + i^{41} + i^{42} + i^{43} + i^{44} = 1$
16. If $(a + bi)^3 = 8$, then $a^2 + b^2 = 4$.