

Test Your Understanding of Complex Numbers

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- Question 1.** What is the complex conjugate of $z = re^{i\theta}$?
- Question 2.** Is the complex number $z = -i$ positive or negative? Explain.
- Question 3.** Solve the equation $(2 + i)z^2 + (8 - i)z + 33 + 19i = 0$.
- Question 4.** Show that for every complex number z and every angle θ the following identity is true: $|1 - e^{i\theta}z| = |\bar{z} - e^{i\theta}|$.
- Question 5.** If $A = 5 + 9i$ and $C = -1 + i$ are the opposite vertices of a square, what are the other two vertices?
- Question 6.** Only one of $8 + i$, $9 + i$, $10 + i$ divides exactly into $1 + 2i$. Could you tell fast which one?
- Question 7.** Express z^{-1} in terms of z . (Assume $z \neq 0$.)
- Question 8.** What is the trigonometric form of $z = \cos(\frac{\pi}{3}) - i \sin(\frac{\pi}{3})$?
- Question 9.** If $z = \cos(\frac{\pi}{3}) + i \sin(\frac{\pi}{3})$, what is $|e^z|$?
- Question 10.** If you know that one root of the equation $z^2 - 4z + 13 = 0$ equals $2 + 3i$, could you immediately tell the other root?