Damping and Amplitude

Quiz: Consider the equation

$$\ddot{x} + b\dot{x} + 2x = \cos(t).$$

If the damping constant b starts at 1 and is increased, what happens to the amplitude of the solution?

Choices:

a) It increases.

b) It decreases.

c) It stays the same.

Answer: The amplitude decreases.
The amplitude of the solution is $\frac{1}{|p(i)|}$. Since $|p(i)| = |1 + bi|$ increases as b increases, the amplitude $\frac{1}{|p(i)|}$ decreases.

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