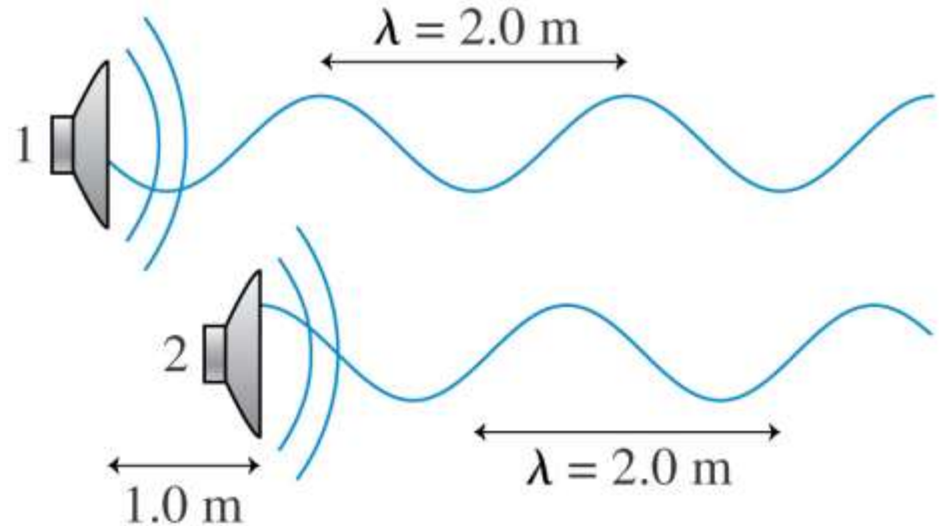
Two loudspeakers emit waves with λ = 2.0 m. Speaker 2 is 1.0 m in front of speaker 1. What, if anything, must be done to cause constructive interference between the two waves?



1. Move speaker 1 backward (to the left) 0.5 m.
2. Move speaker 1 backward (to the left) 1.0 m.
3. Move speaker 1 forward (to the right) 1.0 m.
4. Move speaker 1 forward (to the right) 0.5 m.
5. Nothing. The situation shown already causes constructive interference.

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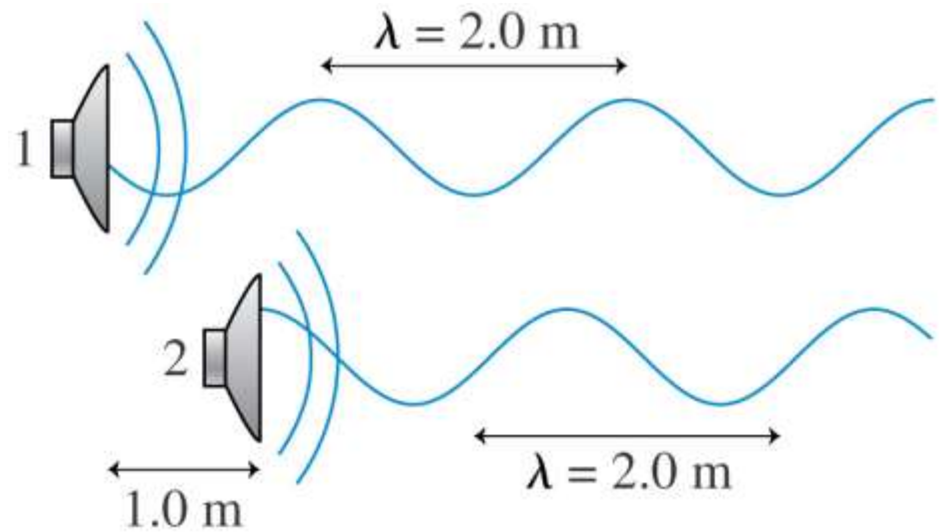

✔ **1. Move speaker 1 backward (to the left) 0.5 m.**
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ConcepTest 16.9 Interference

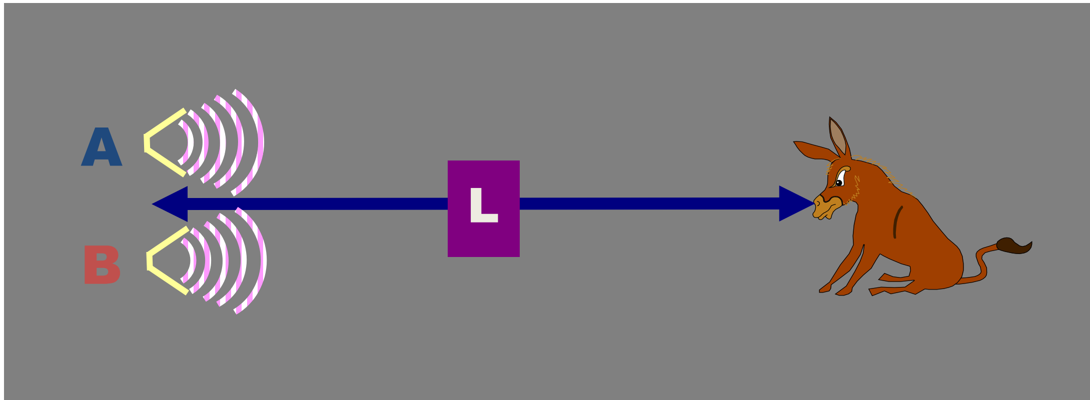
Speakers A and B emit sound waves of λ = 1 m, which interfere constructively at a donkey located far away (say, 200 m). What happens to the sound intensity if speaker A steps back 2.5 m?

1) intensity increases

2) intensity stays the same

3) intensity goes to zero

4) impossible to tell



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If λ = 1 m, then a shift of 2.5 m corresponds to 2.5λ, which puts the two waves **out of phase**, leading to **destructive interference**. The sound intensity will therefore go to zero.

Follow-up: What if you move back by 4 m?