

Standing Waves—Frequency ¹²¹

The figures below show systems of standing waves set up in strings, fixed at both ends, under tension. All of the strings are identical except for their lengths and are under the same tension. The variables in these situations, in addition to the lengths (L) of the strings, are the amplitudes (A) at the antinodes and the number of nodes.

Rank these systems, from greatest to least, on the basis of the frequencies of the waves.

A $A = 12 \text{ cm}$ $L = 25 \text{ cm}$



B $A = 12 \text{ cm}$ $L = 28 \text{ cm}$



C $A = 18 \text{ cm}$ $L = 27 \text{ cm}$



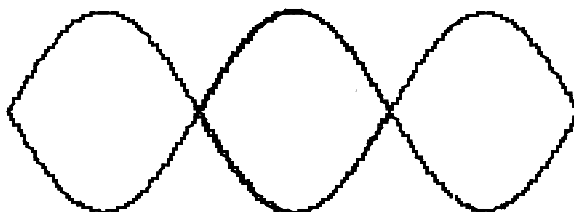
D $A = 16 \text{ cm}$ $L = 28 \text{ cm}$



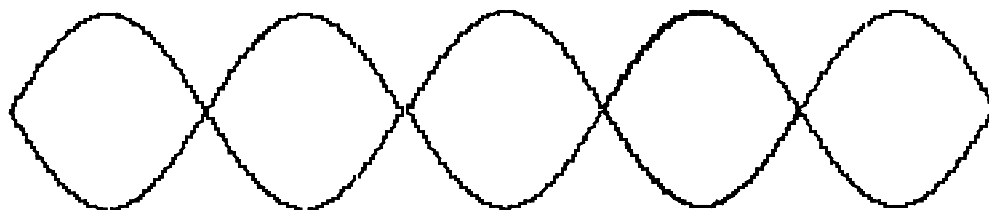
E $A = 24 \text{ cm}$ $L = 20 \text{ cm}$



F $A = 36 \text{ cm}$ $L = 30 \text{ cm}$



G $A = 36 \text{ cm}$ $L = 50 \text{ cm}$



Greatest 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ Least

Or, all of these systems have the same frequency. _____

Please carefully explain your reasoning.

How sure were you of your ranking? (circle one)

Basically Guessed

Sure

Very Sure

1 2 3 4 5 6 7 8 9 10

¹²¹ C. Hieggelke, D. Maloney, T. O’Kuma