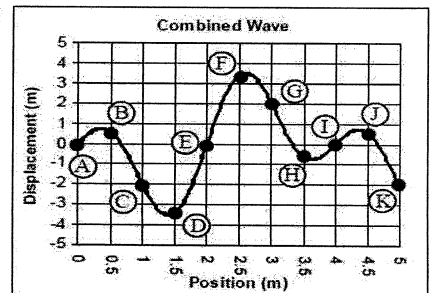
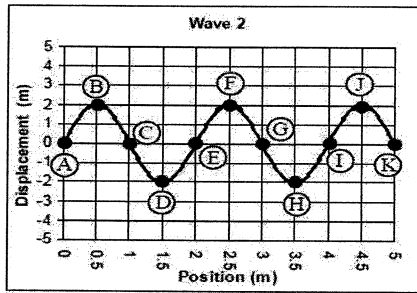
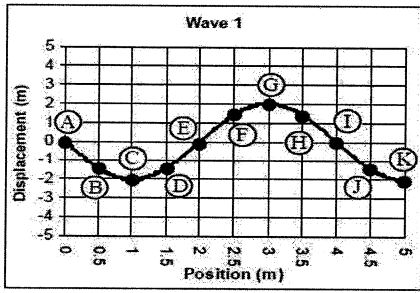


Complex Interference—Waves of Different Period



Each point on the combined wave is the net amplitude of the individual amplitudes of wave 1 and 2.
 (Subscripts: A_1 is wave 1 at A; G_2 is wave 2 at G; J_C is combined wave at J)
 Combining the waves at every point:

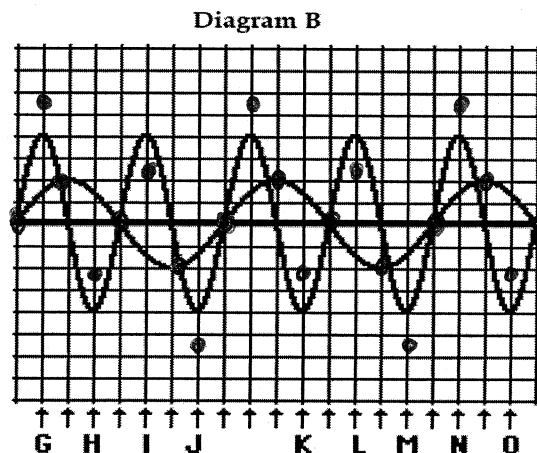
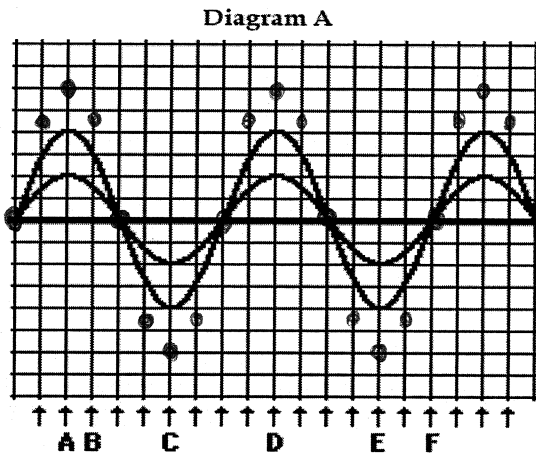
Amplitude on 1 + Amplitude on 2 = Amplitude on C
 $A_1 + A_2 = 0 + 0 = 0$; $A_C = 0$ m
 $B_1 + B_2 = -1.5 + 2 = +0.5$; $B_C = +0.5$ m
 $C_1 + C_2 = -2 + 0 = -2$; $C_C = -2$ m
 $D_1 + D_2 = -1.5 + -2 = -3.5$; $D_C = -3.5$ m
 $E_1 + E_2 = 0 + 0 = 0$; $E_C = 0$ m

$F_1 + F_2 = +1.5 + 2 = +3.5$; $B_C = +3.5$ m
 $G_1 + G_2 = +2 + 0 = +2$; $G_C = +2$ m
 $H_1 + H_2 = +1.5 + -2 = -0.5$; $D_C = -0.5$ m
 $I_1 + I_2 = 0 + 0 = 0$; $I_C = 0$ m
 $J_1 + J_2 = -1.5 + +2 = +0.5$; $J_C = +0.5$ m
 $K_1 + K_2 = -2 + 0 = -2$; $K_C = -2$ m

TRUE or FALSE: Identify the following statements as being either true (T) or false (F).

- False 1. When two pulses meet up with each other while moving through the same medium, they have a tendency to bounce off each other and return back to their origin.
- True 2. Constructive interference occurs when a crest meets up with another crest at a given location along the medium.
- True 3. Destructive interference occurs when a pulse with an amplitude of +5 units interferes with a pulse with an amplitude of -5 units.
- False 4. Destructive interference occurs when a trough meets up with another trough at a given location along the medium.
- False 5. If a pulse with an amplitude of +5 units interferes with a pulse with an amplitude of +3 units, the resulting amplitude of the medium will be +4 units - the average of the two individual amplitudes.
- False 6. If a pulse with an amplitude of +5 units interferes with a pulse with an amplitude of -3 units, then neither constructive nor destructive interference occurs.
- False 7. Two sound waves could never interfere in such a manner as to cancel each other out and produce silence.

Two waves are traveling along the same medium. The diagrams below show the waves on the medium at an instant in time. Utilize the principle of superposition in order to construct the shape of the medium at the instant shown in each diagram. To do so, begin by determining the resulting displacement of the medium at each of the marked locations (↑). Approximate the shape of the remainder of the medium by sketching *from dot to dot*.



Several of the marked positions (↑) above are labeled with a letter. Categorize each labeled position along the medium as being a position where either constructive or destructive interference occurs.

Constructive Interference	Destructive Interference
A, B, C, D, E, G, J, M, N	H, I, K, L, + O