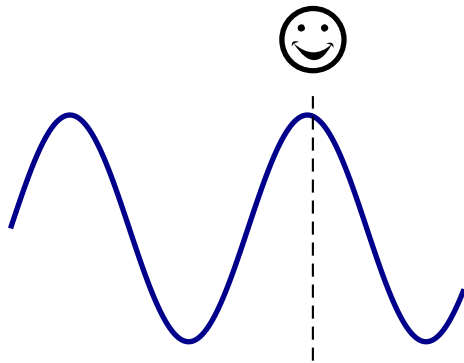


Question 1

A person observes water waves passing one particular point. He counts the number of crests that pass in 10 minutes.

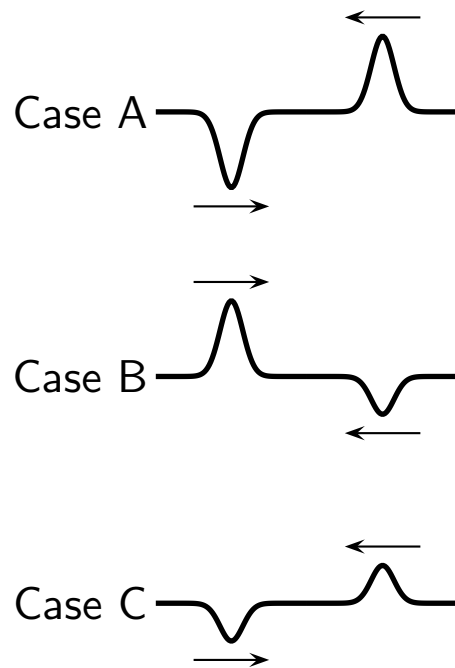


The waves are produced by someone dipping her foot in and out of the water repeatedly. At one point the rate at which she dips her foot in and out triples. Which of the following is true?

1. The frequency stays constant and the number of crests passing (in 10 min) stays constant.
2. The frequency triples and the number of crests passing stays constant.
3. The frequency stays constant and the number of crests passing triples.
4. The frequency triples and the number of crests passing triples.

Question 2

Various pulses on a string approach each other as illustrated.



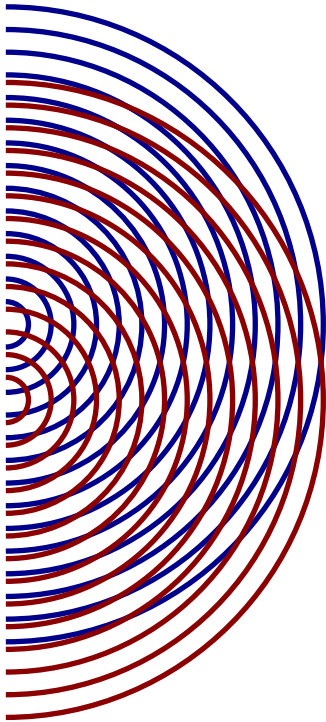
The pulses overlap and interfere.

Which of the following is the rank of the peak height of the string at the moment that the pulses overlap completely?

1. A largest, B middle, C smallest.
2. All three same.
3. B largest, A middle, C smallest.
4. B largest , A and C same but smaller.

Question 3

Two light waves overlap. The crests of the waves are as illustrated.

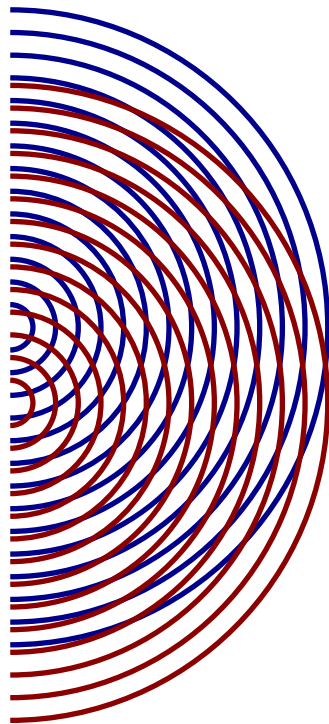


The wavelength of the light is tripled. Which of the following is true of the spacing between bright fringes on a distant screen?

1. The spacing increases.
2. The spacing decreases.
3. The spacing stays the same.

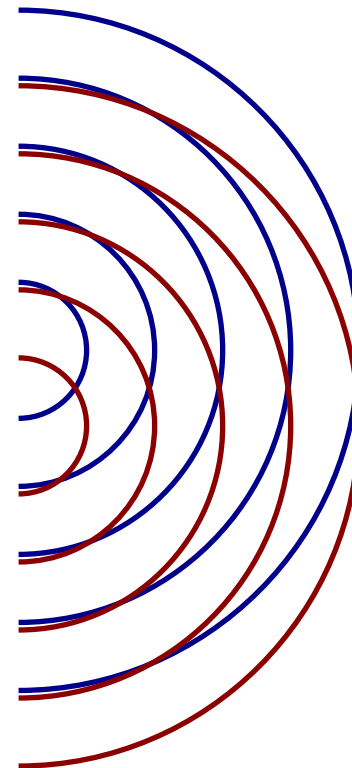
Wavelength Effects in Interference

Original wavelength



Constructive regions closer

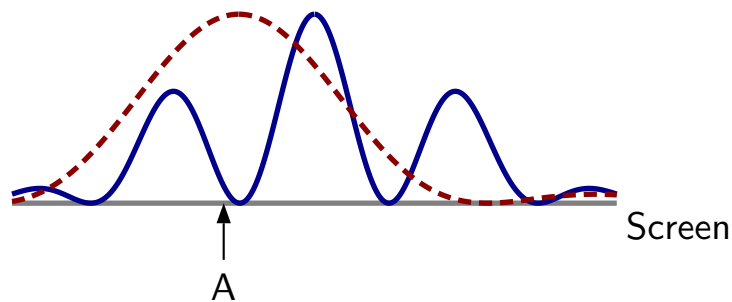
Triple wavelength



Constructive regions further

Question 4

Light is incident on a double slit arrangement. The probability distribution for arrival of photons when both slits are open is indicated by the solid line. The probability distribution for arrival of photons when *the left slit is open and the right slit is closed* is illustrated by the dashed line.



The experiment is initially done with just the left slit open. Subsequently the right slit is opened (the left slit stays open). Which of the following is true?

1. Opening the right slit does not change the number of photons that arrive at A.
2. Opening the right slit decreases the number of photons that arrive at A.
3. Opening the right slit increases the number of photons that arrive at A.

Question 5

A single photon is fired toward an arrangement of two slits. A screen is placed beyond the slits.



Which of the following is true?

1. The photon splits into multiple photons; some pass through each slit and they arrive at multiple locations on the screen.
2. The photon smears itself into a wave arrive at all points on the screen.
3. The photon arrives at a one location and this will always be the same if another photon is fired after it.
4. The photon arrives at a one location and this will probably differ from that for another photon is fired after it.