

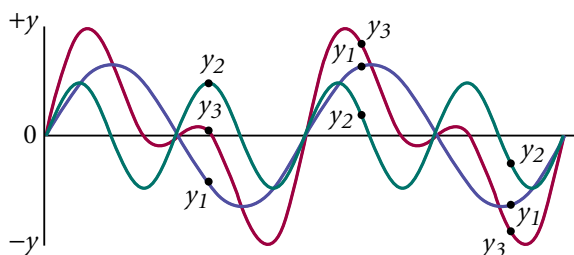
WAVE INTERACTIONS

Review Questions

36. Using the superposition principle, draw the resultant waves for each of the examples below.



37. What is the difference between constructive interference and destructive interference?
38. Which one of the waveforms shown below is the resultant waveform?



39. Anthony sends a series of pulses of amplitude 24 cm down a string that is attached to a post at one end. Assuming the pulses are reflected with no loss of amplitude, what is the amplitude at a point on the string where two pulses are crossing if
- the string is rigidly attached to the post?
 - the end at which reflection occurs is free to slide up and down?

Conceptual Questions

40. Can more than two waves interfere in a given medium?
41. What is the resultant displacement at a position where destructive interference is complete?
42. When two waves interfere, can the resultant wave be larger than either of the two original waves? If so, under what conditions?
43. Which of the following wavelengths will produce standing waves on a string that is 3.5 m long?
- 1.75 m
 - 3.5 m
 - 5.0 m
 - 7.0 m

MIXED REVIEW

44. In an arcade game, a 0.12 kg disk is shot across a frictionless horizontal surface by being compressed against a spring and then released. If the spring has a spring constant of 230 N/m and is compressed from its equilibrium position by 6.0 cm, what is the magnitude of the spring force on the disk at the moment it is released?

45. A child's toy consists of a piece of plastic attached to a spring, as shown at right. The spring is compressed against the floor a distance of 2.0 cm and released. If the spring constant is 85 N/m, what is the magnitude of the spring force acting on the toy at the moment it is released?



46. You dip your finger into a pan of water twice each second, producing waves with crests that are separated by 0.15 m. Determine the frequency, period, and speed of these water waves.
47. A sound wave traveling at 343 m/s is emitted by the foghorn of a tugboat. An echo is heard 2.60 s later. How far away is the reflecting object?
48. The notes produced by a violin range in frequency from approximately 196 Hz to 2637 Hz. Find the possible range of wavelengths in air produced by this instrument when the speed of sound in air is 340 m/s.
49. What is the free-fall acceleration in a location where the period of a 0.850 m long pendulum is 1.86 s?
50. Yellow light travels through a certain glass block at a speed of 1.97×10^8 m/s. The wavelength of the light in this particular type of glass is 3.81×10^{-7} m (381 nm). What is the frequency of the yellow light?
51. A certain pendulum clock that works perfectly on Earth is taken to the moon, where $a_g = 1.63 \text{ m/s}^2$. If the clock is started at 12:00 A.M., what will it read after 24.0 h have passed on Earth?