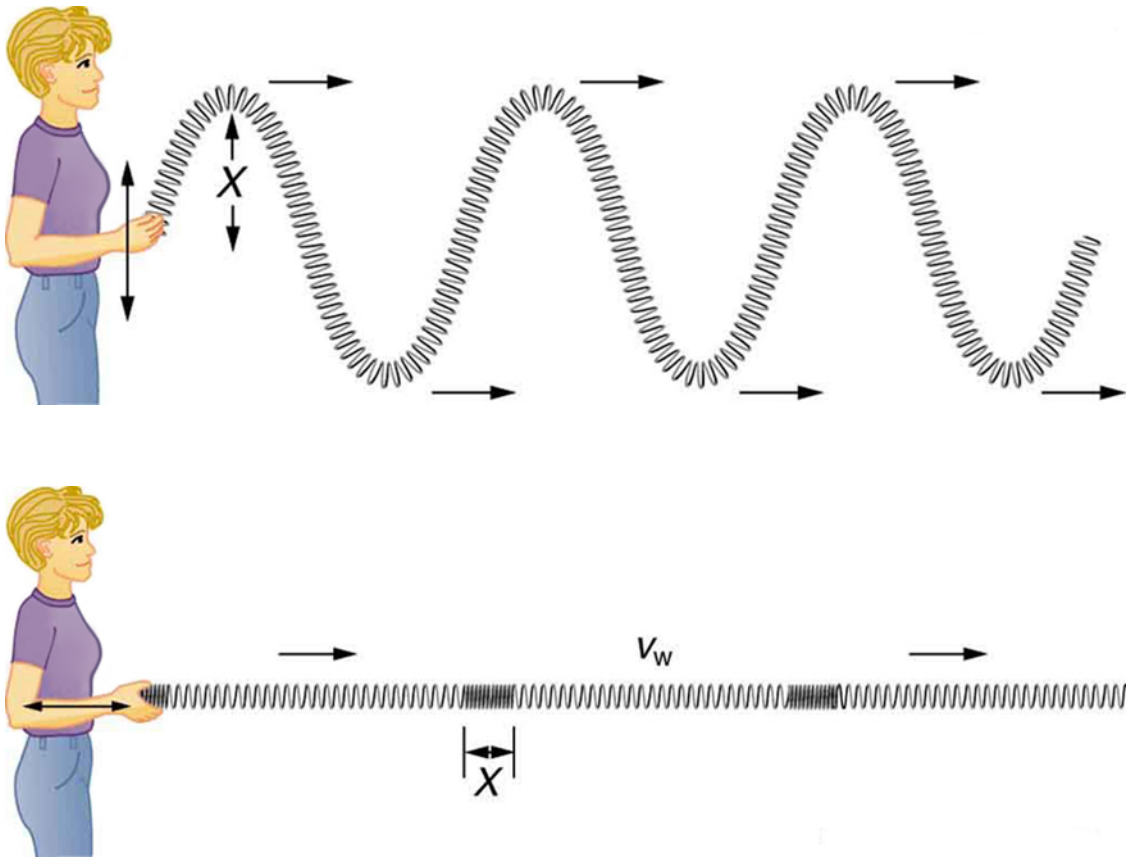
Name: Date: Period:

Wave Phenomena

Basic Properties

Types of Waves



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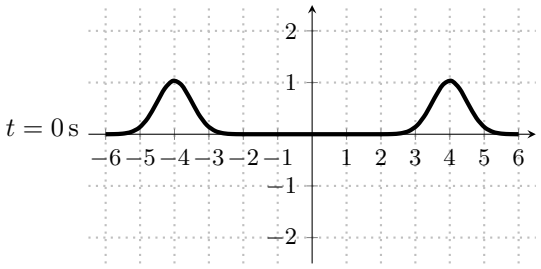
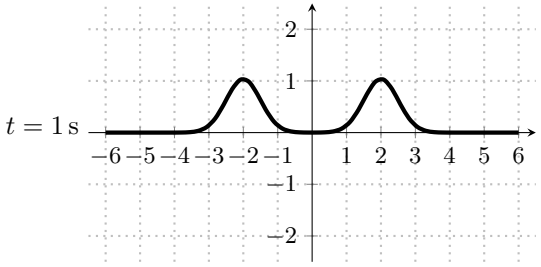
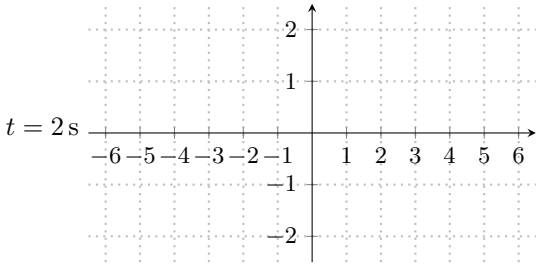
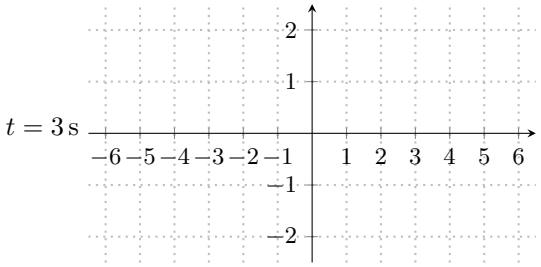
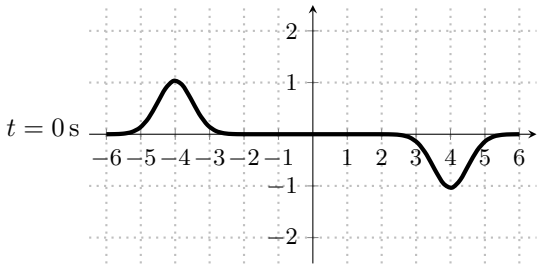
Superposition

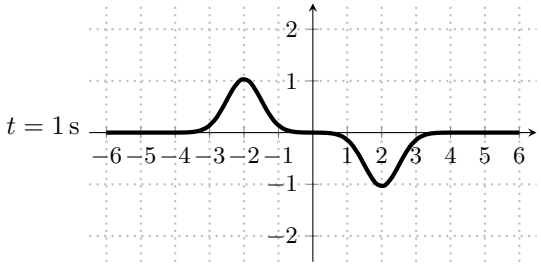


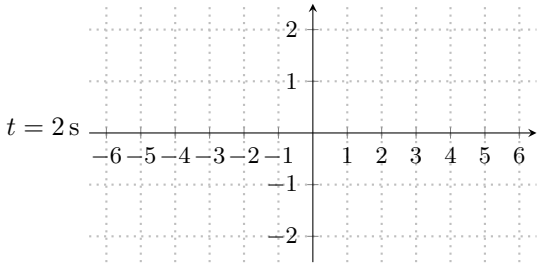


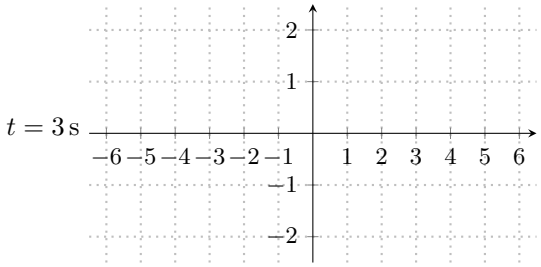








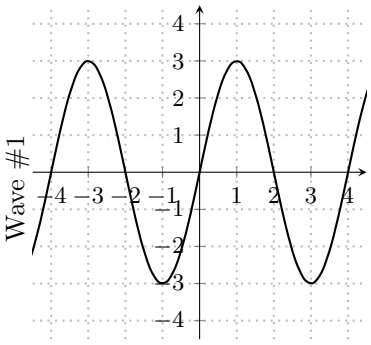


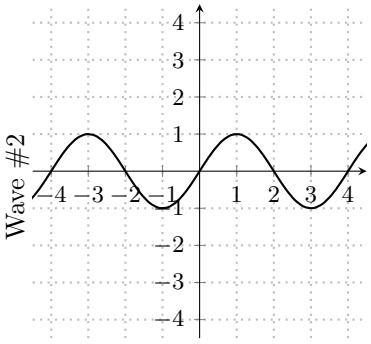


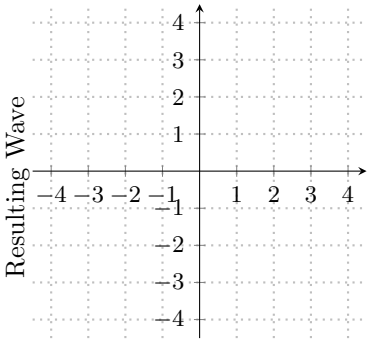
Name: Date: Period:

Interference

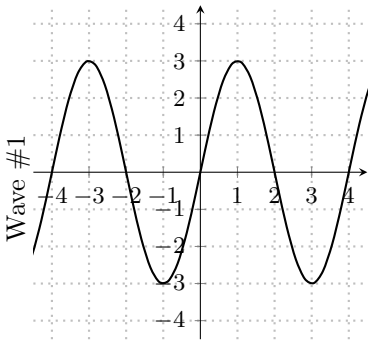
Situation (a)

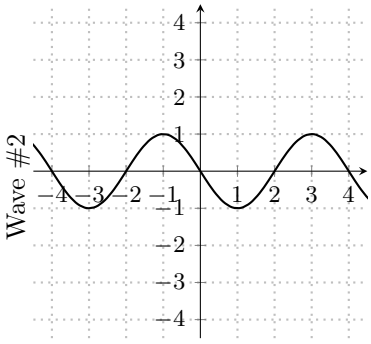


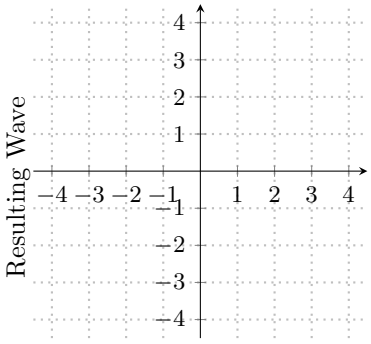




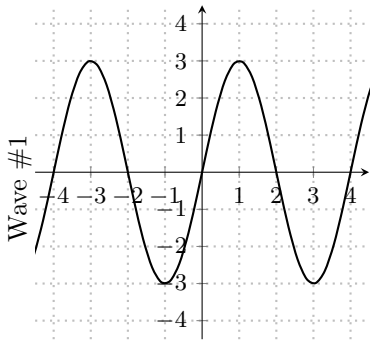
Situation (b)

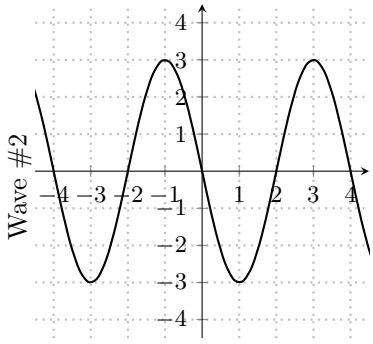


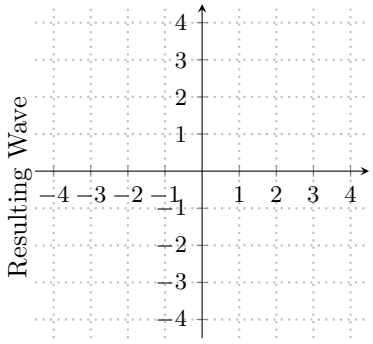




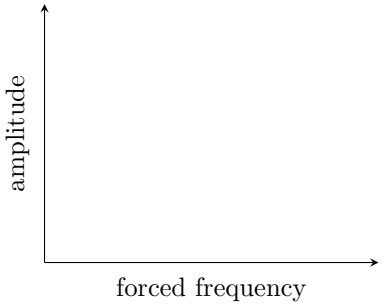
Situation (c)

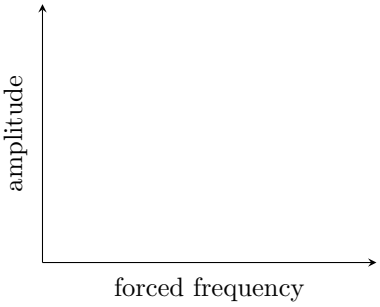






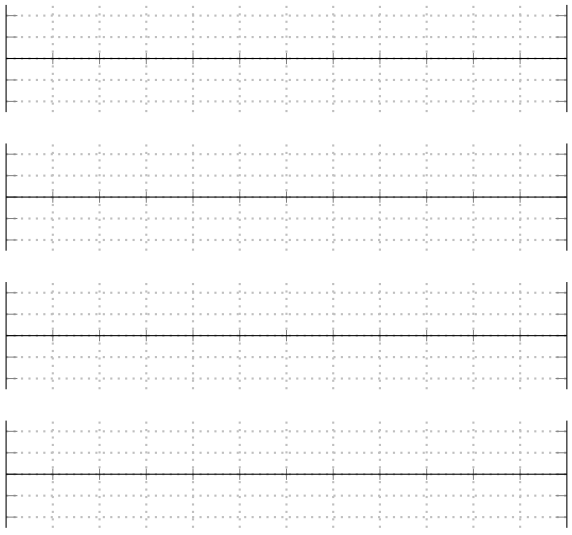
Resonance





Standing Waves

"Normal Modes"; "Harmonics"; "Overtones"



Name: Date: Period:

Example Problem The lowest note an open trumpet plays is C (concert B♭) at 466.16 Hz. It turns out that this is actually the second harmonic of the air column in the trumpet

(a) Calculate the fundamental frequency of the trumpet.

(b) Calculate the first eight harmonics of the trumpet.

(c) Use the table below to determine which notes these harmonics correspond to.

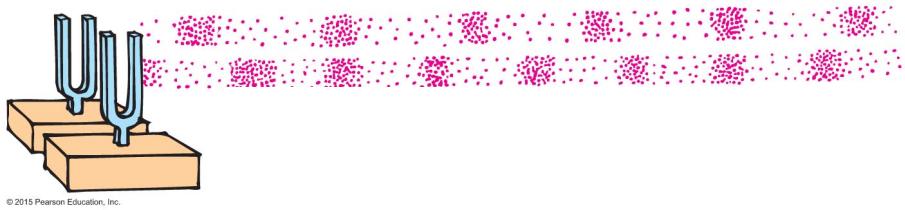
Concert Pitch	B♭ Trumpet Pitch	Frequency (Hz)
$B♭_3$	C_4	233.08
B_3	$D♭_4$	246.94
C_4	D_4	261.63
$D♭_4$	$E♭_4$	277.18
D_4	E_4	293.66
$E♭_4$	F_4	311.13
E_4	$G♭_4$	329.63
F_4	G_4	349.23
$G♭_4$	$A♭_4$	369.99
G_4	A_4	392.00
$A♭_4$	$B♭_4$	415.30
A_4	B_4	440.00

Concert Pitch	B♭ Trumpet Pitch	Frequency (Hz)
$B♭_4$	C_5	466.16
B_4	$D♭_5$	493.88
C_5	D_5	523.25
$D♭_5$	$E♭_5$	554.37
D_5	E_5	587.33
$E♭_5$	F_5	622.25
E_5	$G♭_5$	659.25
F_5	G_5	698.46
$G♭_5$	$A♭_5$	739.99
G_5	A_5	783.99
$A♭_5$	$B♭_5$	830.61
A_5	B_5	880.00

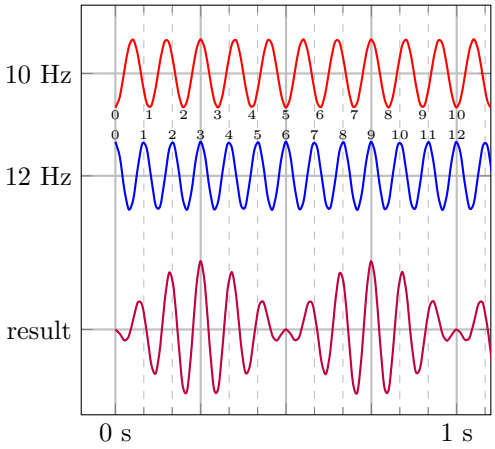
Concert Pitch	B♭ Trumpet Pitch	Frequency (Hz)
$B♭_5$	C_6	932.33
B_5	$D♭_6$	987.77
C_6	D_6	1046.50
$D♭_6$	$E♭_6$	1108.73
D_6	E_6	1174.66
$E♭_6$	F_6	1244.51
E_6	$G♭_6$	1318.51
F_6	G_6	1396.91
$G♭_6$	$A♭_6$	1479.98
G_6	A_6	1567.98
$A♭_6$	$B♭_6$	1661.22
A_6	B_6	1760.00
$B♭_6$	C_7	1864.66

Name: Date: Period:

Beats



Take a look at the illustration below that refers to a wave of frequency 10 Hz being played at the same time as a wave of frequency 12 Hz.



Draw your own beats! Draw two bugs jumping on the water. One bug jumps forward 3 cm each hop; the other bug jumps forward 4 cm each hop.