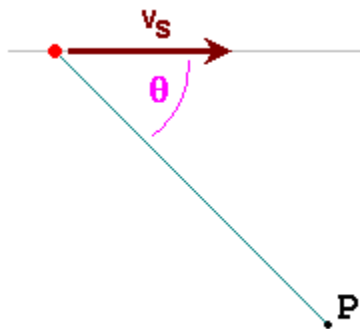


DAY 19 - Homework

- Derive the equation for the apex angle formed by a shock wave. Calculate this angle for a bullet that is traveling at twice the speed of sound in air. Calculate this angle for a boat that is traveling a twice the speed of waver waves in the water on which it is floating.
- A musician riding on a parade float is playing middle C on a flute. How fast must the parade float be moving toward you for that note to sound like C#? (See piano key table at right.)
- A source gives off waves of wavelength λ when at rest. The source moves with speed v_s as shown below. Derive an equation for the wavelength observed at location P, and show that for $\theta = 0$ it reduces to the equation derived in the Example Problem in today's Topic Summary.



Middle C

	A0	27.5	A0#	29.135
	B0	30.868		
	C1	32.703	C1#	34.648
	D1	36.708	D1#	38.891
	E1	41.203		
	F1	43.654	F1#	46.249
	G1	48.999	G1#	51.913
	A1	55.000	A1#	58.270
	B1	61.735		
	C2	65.406	C2#	69.296
	D2	73.416	D2#	77.782
	E2	82.407		
	F2	87.307	F2#	92.499
	G2	97.999	G2#	103.83
	A2	110.00	A2#	116.54
	B2	123.47		
	C3	130.81	C3#	138.59
	D3	146.83	D3#	155.56
	E3	164.81		
	F3	174.61	F3#	185.00
	G3	196.00	G3#	207.65
	A3	220.00	A3#	233.08
	B3	246.94		
	C4	261.63	C4#	277.18
	D4	293.66	D4#	311.13
	E4	329.63		
	F4	349.23	F4#	369.99
	G4	392.00	G4#	415.30
	A4	440.00	A4#	466.16
	B4	493.88		
	C5	523.25	C5#	554.37
	D5	587.33	D5#	622.25
	E5	659.25		
	F5	698.46	F5#	739.99
	G5	783.99	G5#	830.61
	A5	880.00	A5#	932.33
	B5	987.77		
	C6	1046.5	C6#	1108.7
	D6	1174.7	D6#	1244.5
	E6	1318.5		
	F6	1396.9	F6#	1480.0
	G6	1568.0	G6#	1661.2
	A6	1760.0	A6#	1864.7
	B6	1979.5		
	C7	2093.0	C7#	2217.5
	D7	2349.3	D7#	2489.0
	E7	2637.0		
	F7	2793.8	F7#	2960.0
	G7	3136.0	G7#	3322.4
	A7	3520.0	A7#	3729.3
	B7	3951.1		
	C8	4186.0		