## 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.
- 2. 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.)
- 3. A source gives off waves of wavelength  $\lambda$  when at rest. The source moves with speed v<sub>s</sub> 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.



	A0 27.5	
	B0 30.868	A0# 29.135
2	C4 22 702	
	C1 32.703	C 1# 34.648
	D1 36.708	D 1# 38.891
	E1 41.203	
	F1 43.654	F1# 46.249
	G1 48.999	G1# 51.913
	A1 55.000	A1# 50 270
-	B1 61.735	All# 30.210
	C2 65.406	02# 69 296
	D2 73.416	02# 00.200
() ()	E2 82.407	02# rr.roz
	F2 87.307	F2# 92 499
	G2 97.999	62# 103.83
	A2 110.00	A2# 146.54
	B2 123.47	A2# 110.04
	C3 130.81	C3# 138.59
	D3 146.83	0.3# 155.56
	E3 164.81	
	F3 174.61	F3# 185.00
	G3 196.00	G3# 297.65
	A3 220.00	A3# 233.08
3	B3 246.94	
22 V	C4 261.63	C4# 277.18
	D4 293.66	D4# 311.13
2	E4 329.63	
	F4 349.23	F4# 369.99
	G4 392.00	64# 415 30
	A4 440.00	64# 466 16
2	B4 493.88	7411 400.10
	C5 523.25	C 5# 554 27
	D5 587.33	05# 004.31
	E5 659.25	00# 022.20
	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
5.5	E6 1318.5	
2	F6 1396.9	10000000000000000000000000000000000000
	G6 1568.0	F6# 1480.0
	A6 1760.0	G6# 1661.2
	B6 1979.5	A6# 1864.7
	C7 2093.0	074 0047 5
	D7 2349.3	07# 2217.5
	E7 2637.0	D7# 2489.0
	F7 2793.8	E7# 2000.0
	G7 3136.0	F IM 2360.0
		G7W 2222 4
	A7 3520.0	G7# 3322.4
	A7 3520.0 B7 3951.1	G7# 3322.4 A7# 3729.3
		A0 27.5   B0 30.868   C1 32.703   D1 36.708   E1 41.203   F1 43.654   G1 48.999   A1 65.000   B1 61.735   C2 65.406   D2 73.416   E2 82.407   F2 87.307   G2 97.999   A2 110.00   B2 123.47   C3 130.81   D3 146.83   E3 164.81   F3 174.61   G3 196.00   A3 220.00   B3 246.94   C4 261.63   D4 293.66   E4 329.63   F4 349.23   G4 392.00   A4 40.00   B4 433.88   C5 523.25   D5 587.33   E5 659.25   F5 688.00   B5