DAY 19 – Homework

1. 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 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.