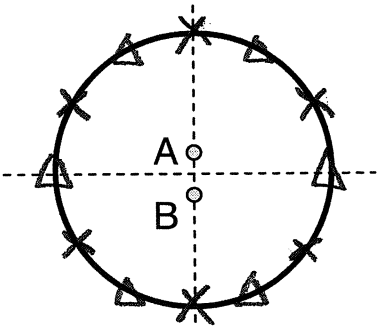
Physics 133, 3:30pm Spring 2006, Quiz 2 Name: KEY

TA: _____

constructive interference: $\Delta\phi = 2\pi\frac{\Delta r}{\lambda} + \Delta\phi_o = 2\pi m$

destructive interference: $\Delta\phi = 2\pi\frac{\Delta r}{\lambda} + \Delta\phi_o = 2\pi\left(m + \frac{1}{2}\right)$

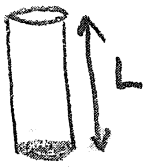
1) The two sources A and B are separated by a distance D=1.5λ, equally spaced from the origin along the y-axis. They are identical, and both emitting waves of wavelength λ. Indicate **on the figure** (10 pts)
   a) Approximate positions of all points on the circle where the interference is fully constructive (use a Δ to mark these)
   b) Approximate positions of all points on the circle where the interference is fully destructive (use an **X** to mark these).



$v = \lambda f$ open/closed tubes: $\lambda_m = 4L/m$ m = 1,3,5,...

fixed strings closed/closed tubes: $\lambda_m = 2L/m$ m = 1,2,3,...

2) A tuning fork with a frequency of 680Hz is struck right above the opening of an adjustable-length open-closed tube. Imagine the tube length can be adjusted from essentially zero length to a maximum of 50cm. How many resonant frequencies can be excited in the tube, and at what lengths does this happen? Use v=340m/s for the speed of sound in air. (10 pts)



$\lambda_{air} = \frac{v}{f} = \frac{340\,m/s}{680/s} = 0.5\,m = 50\,cm$

$\lambda_m = \frac{4L}{m}$

$L = \frac{m\lambda_m}{4}$

$L = m(12.5)$

m	L
1	12.5 cm
3	37.5 cm
5	62.5 cm

} 2 Frequencies at these Lengths