Name: _____

PHY 106 Test 2 July 1, 2004 20 minutes

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1. A 440 Hz siren is broadcast by a parked police car.

   a) If you are driving toward the police car at 30 m/s, what frequency do you hear?

   b) You slow down as you pass the police car. If you now hear a tone of 435 Hz, what is your speed?

$$f' = f\left(1 \pm \frac{v_o}{v_{sound}}\right)$$

2. The speed of a wave on a sting is 172 m/s when the tension is 123 N.

   a) If the mass of the string is 27 g, how long is it?

   b) To what value must the tension be increased to raise the wave speed to 200 m/s?

   c) If power used to generate the wave is the same in (a) and (b), by what factor must amplitude be decreased in going from the wave in (a) to the one in (b)? Assume that frequency does not change. $P = \frac{1}{2}\mu A^2\omega^2 v$

3. A wave travels in the negative *x*-direction with an amplitude of 1.4 m, a frequency of 500 Hz, and a speed of 325 m/s.

   a) Write down the wave equation for this wave

   b) Sketch a snapshot of the wave at *t*=0. Label your axes and indicate important points with their values.