Name ____ Date _____________ Period______

Wave Optics: Interference ws 3

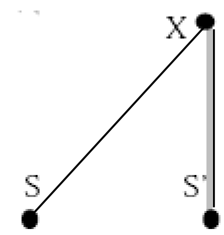
1. Dan Sinkween is standing on a beach watching waves come through two openings in a wave break. The water waves are 3.0 m long and he is standing 26.5 m from one opening and 31.0 m from the other. Will there be waves at his feet or not?

2. Two speakers are vibrating in phase at 170 Hz. Ken E. Doit is standing 10.m from speaker A. What are 3 distances someone could move speaker B from Ken to provide destructive interference if he remains 10 m from speaker A? Give 3 distances for constructive interference.

3. Two sources, S1 and S2, are producing an interference pattern. Constructive interference occurs at point P, which happens to be on the third constructive line past the center (zero order) line. The distance from S1 to P is 30 cm and the distance from S2 to P is 24 cm. What is the wavelength being produced? Draw a sketch of the situation.

4. Two sources, S1 and S2, are producing 2.0 cm wavelength waves. Destructive interference occurs at point P, which happens to be on the second destructive line past the center (zero order) line. The distance from S1 to P is 26 cm. What is the distance between S2 and P? Draw a sketch of the situation.

5. Waves are produced by two point sources S and S' vibrating in phase. See the accompanying diagram. X represents the location of the 2^{nd} interference minima. The path difference SX – S'X is 4.5 cm. The wavelength of the waves is approximately?



6. Monochromatic light falls on a single slit 0.01 cm wide and develops a first–order minimum (dark band) 0.59 cm from the center of the central bright band on a screen that is one meter away. Determine the wavelength of the light.

7. Two point sources in a ripple tank radiate waves in phase with a constant wavelength of 0.02 meter. The first-order interference maximum appears at 6° (use sin 6° = 0.1). The separation of the sources is most nearly.

8. Using tan θ = sin θ, derive the interference pattern equations.