Sound Wave Reflection in a Room Worksheet

Names: ____________________________________________________________

Materials

- ruler
- protractor
- pencil
- calculator

Legend

Problems

Problem 1: Draw the direct path between the sound source and the listener, which connects the stars on each circle. In this type of room there are no reflecting sound waves because the walls absorb all of the sound energy during reflections.

Calculate the distance the sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener (speed of sound = 343 m/s).
Problem 2: Draw the paths of the reflection waves until they reach the listener. All the waves should intersect at the same point on the listener. Remember that the angle of incidence and reflection are equal.

Calculate the distance the sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener for the direct path.

Calculate the total distance the top reflected sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener. Make sure to include the full path the sound wave travels!

Calculate the total distance the bottom reflected sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener. Make sure to include the full path the sound wave travels!
**Problem 3:** First draw the path of the top reflected sound wave until it reaches the next wall. Next draw the bottom reflected sound wave until it reaches the next wall. The point where the lines cross is the front edge of the listener circle, as was the case in the previous problems. Once you have the listener drawn, draw the direct path from the sound source to the listener. Remember that the lines should all intersect at the same point!

Calculate the distance the sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener for the direct path.

Calculate the total distance the top reflected sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener. Make sure to include the full path the sound wave travels!

Calculate the total distance the bottom reflected sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener. Make sure to include the full path the sound wave travels!
Challenge Problem

This problem tests your comprehension of the topics from the previous problems. In this problem you are to draw the direct path connecting the stars on the sound source and the listener and draw two reflection paths that bounce off at least one wall. This problem is very similar to the previous problems requiring the same type of logic. Good luck!

Calculate the distance the sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener for the direct path.

Calculate the total distance the top reflected sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener. Make sure to include the full path the sound wave travels!

Calculate the total distance the bottom reflected sound wave travels from the sound source to the listener in meters and determine how long it will take the sound to reach the listener. Make sure to include the full path the sound wave travels!