**The Parabolic Reflector Microphone**

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**Definitions**

* A **parabolic microphone** is an instrument that uses a parabolic reflector to collect and focus sound waves on a transducer.
* A **transducer** is a device that converts energy from one form to another. (In this case, it turns *sound energy* into *electrical energy*.)

**Uses**

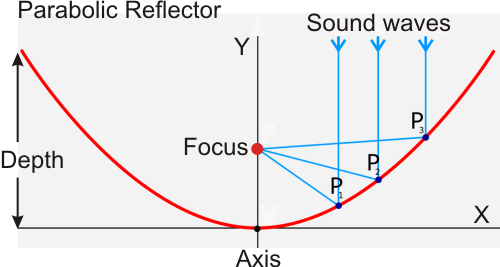
* **Sporting Events -** Audio recording on the sideline or interviews
* **Bird Calls**
* **Espionage -** used in past wars such as WWII.
* **Law Enforcement -** used for scouting an area

**Other Commonly Used Mics**

**Shotgun Mic -** Used commonly for interviews. Directional mic that picks up audio between 1 and 3 feet.

**Lav Mic -** Used commonly for interviews. Attached onto subjects’ shirt or area near their mouth to pick up their voice.

**How it Works and the Math Behind it All**

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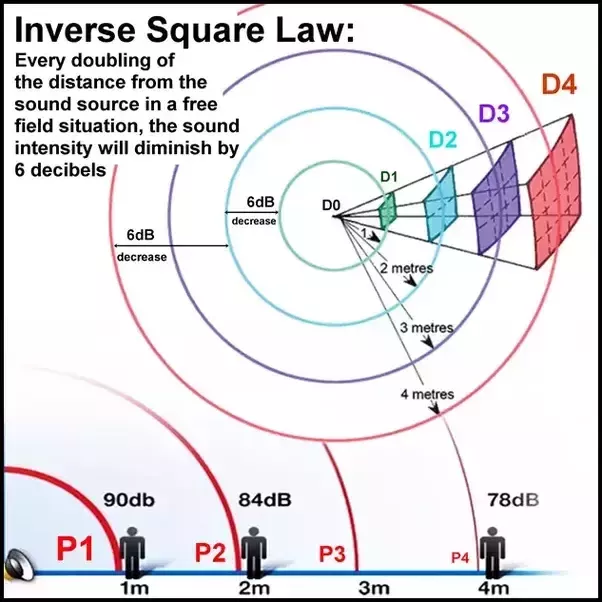
**Math Definitions**

* A **parabola** is a set of all points in a plane that are equidistant from a fixed line (**directrix**) and fixed point (**focus**) in the plane.
* **Axis of the parabola -** the line that goes through the focus and is perpendicular to the directrix
* **Vertex of the parabola -** the point of intersection of the parabola with the axis.

**Important Ideas**

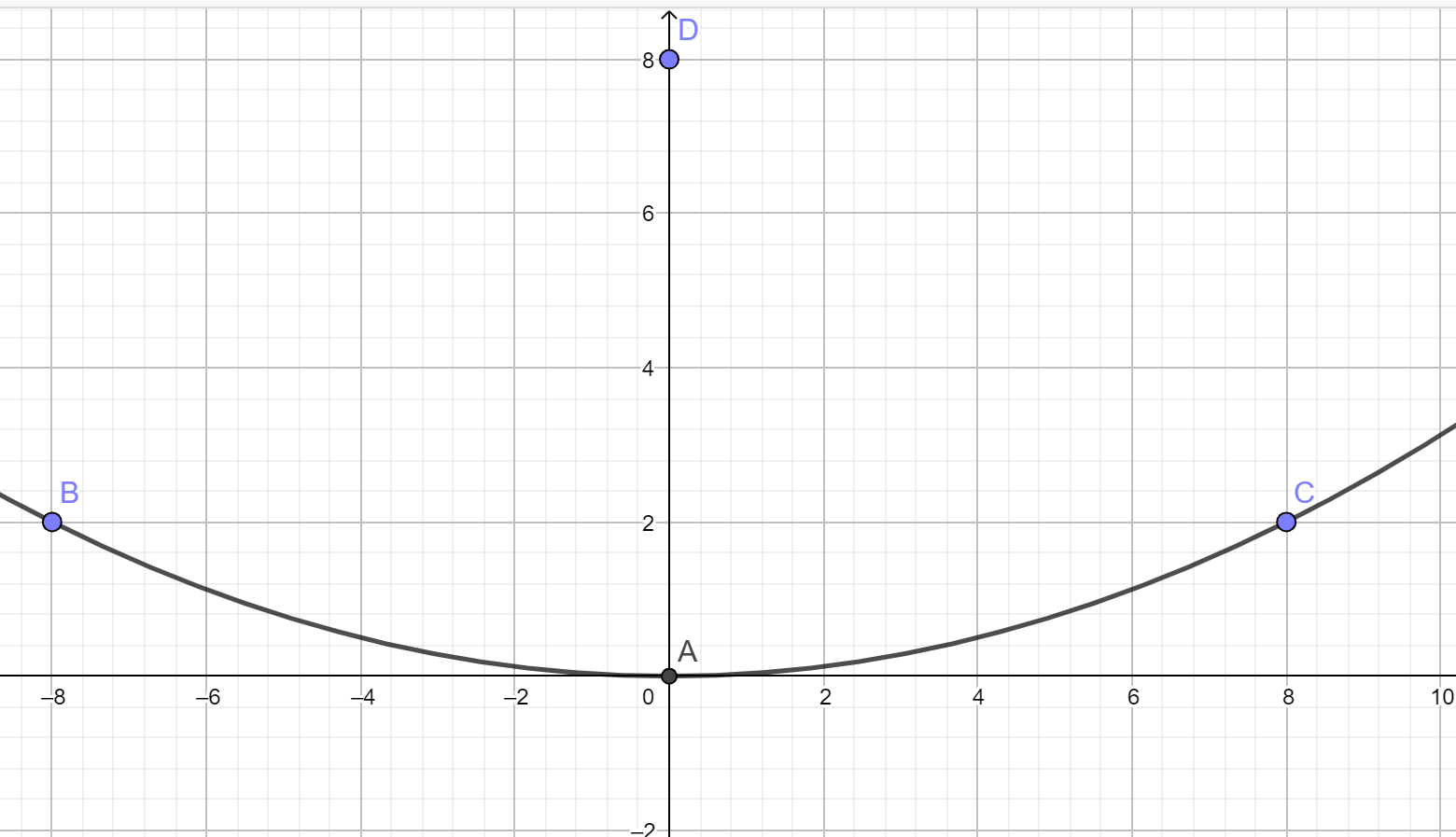
* Anything approaching the dish that is *parallel* to the **dish’s center line** and *perpendicular* to the **directrix** is then reflected and focused to a single point (the focus
* The audio signal is **reduced by 6dB** when the **distance is doubled**.
* However, the amplifier that is on the mic is able to gather all the sound it picks up, regardless the distance, and increase the audio and noise levels.

**Inverse Square Law -** a law stating that a specified physical quantity or intensity changes in inverse proportion to the square of the distance from the source.

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**Question:**

The cross section of a satellite dish is a parabola. Signals from a satellite strike the surface of the dish and are reflected to a single point (the focus), where the receiver is located. If the dish is 16 feet across at its opening and 2 feet deep at its center, at what a position should the receiver be placed? (Find p)



**Hint:** The equation for finding the focus: x2 = 4py