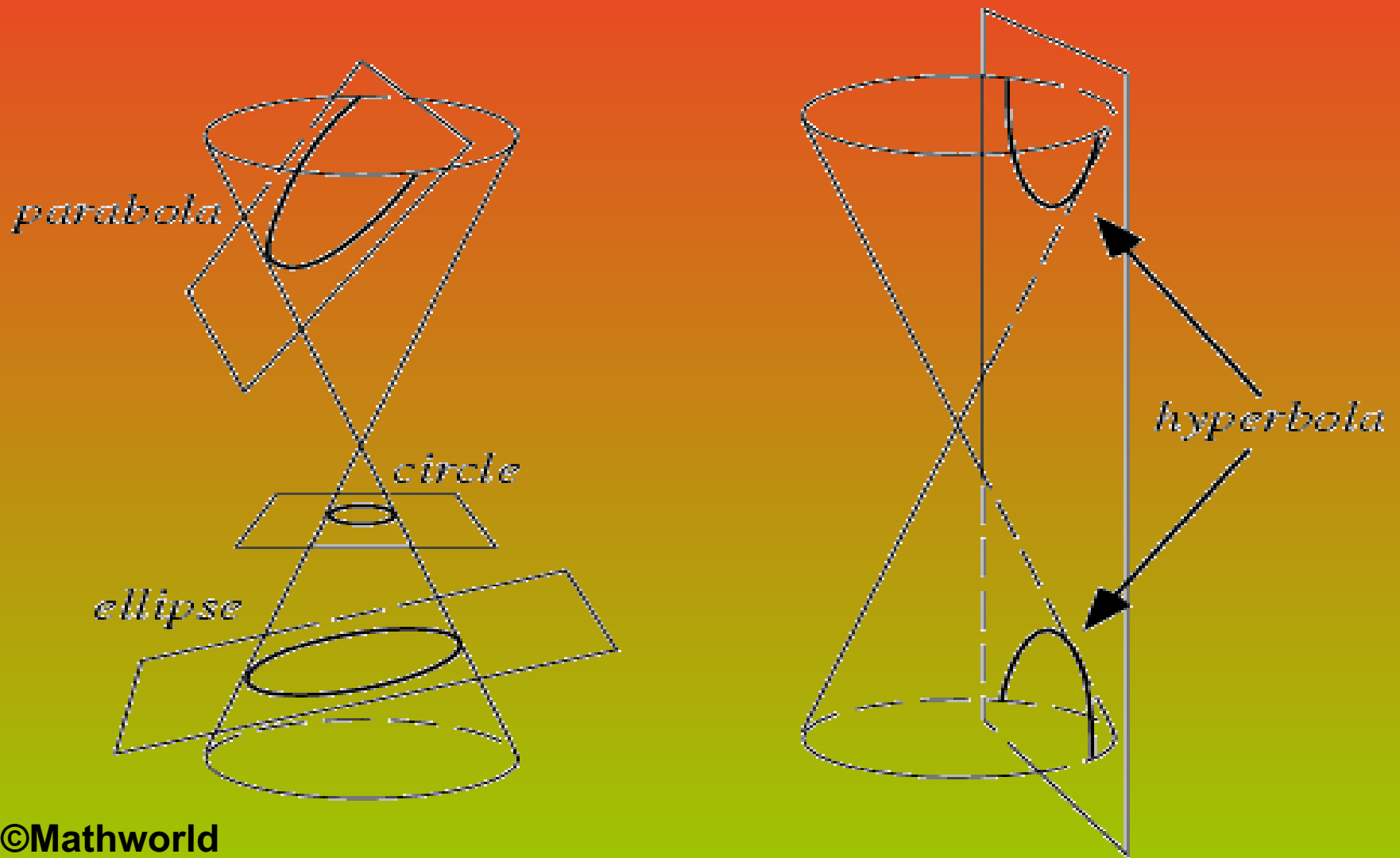


Conic Sections



Circle



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Parabolas



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Ellipse



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Statuary Hall in the U.S. Capital building is elliptic. It was in this room that John Quincy Adams, while a member of the House of Representatives, discovered this acoustical phenomenon. He situated his desk at a focal point of the elliptical ceiling, easily eavesdropping on the private conversations of other House members located near the other focal point.

Why are the foci of the ellipse important?

- The ellipse has an important property that is used in the reflection of light and sound waves. Any light or signal that starts at one focus will be reflected to the other focus. This principle is used in *lithotripsy*, a medical procedure for treating kidney stones. The patient is placed in an elliptical tank of water, with the kidney stone at one focus. High-energy shock waves generated at the other focus are concentrated on the stone, pulverizing it.

Why are the foci of the ellipse important?

- St. Paul's Cathedral in London. If a person whispers near one focus, he can be heard at the other focus, although he cannot be heard at many places in between.



Hyperbola

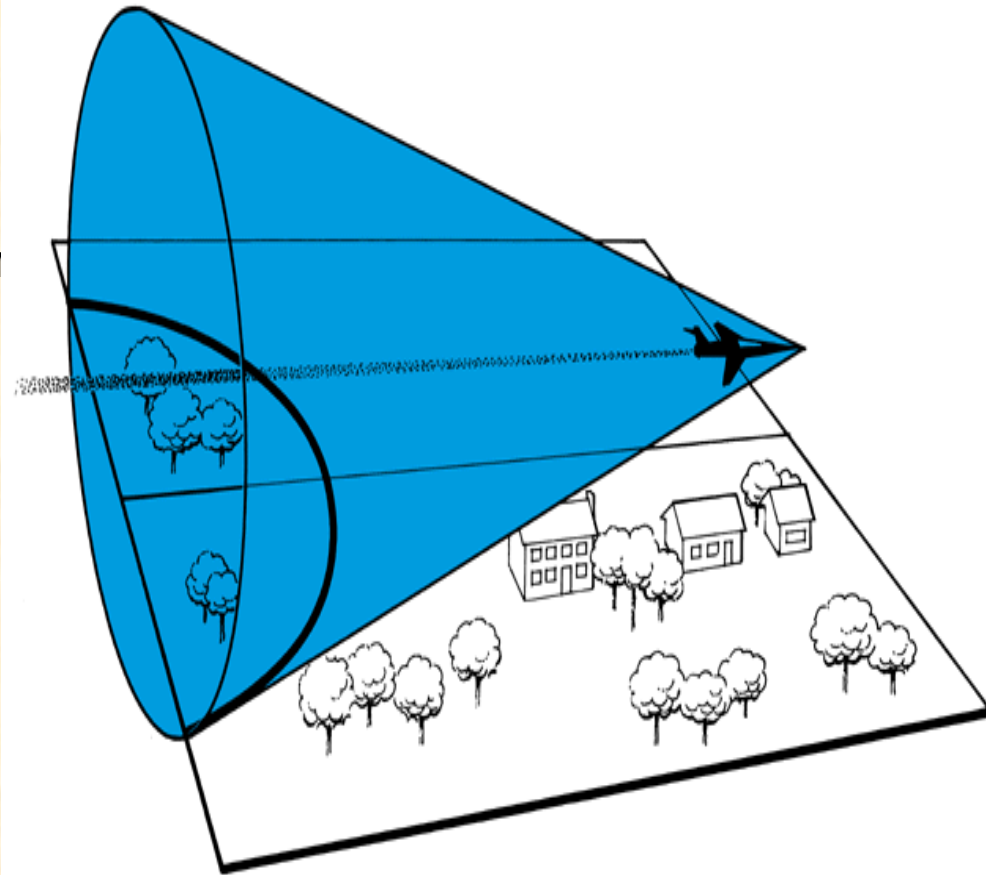
© Jill Britton, September 25, 2003



The huge chimney of a nuclear power plant has the shape of a hyperboloid, as does the architecture of the James S. McDonnell Planetarium of the St. Louis Science Center.

Where are the Hyperbolas?

- A sonic boom shock wave has the shape of a cone, and it intersects the ground in part of a hyperbola. It hits every point on this curve at the same time, so that people in different places along the curve or the ground hear it at the same time. Because the airplane is moving forward, the hyperbolic curve moves forward and eventually the boom can be heard by everyone in its path.



Now check this out!

[https://www.youtube.com/watch
?v=fW2Y8DLwvxs](https://www.youtube.com/watch?v=fW2Y8DLwvxs)

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