Applications of Parabolas

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Announcements

1. Exam on Monday.
2. Homework in MyOpenMath due Wednesday of next week.
3. Office hours today 10am - 11am (No office hours tomorrow).

Applications of Parabolas

A car's headlights are shaped as parabolic reflectors with the actual light at the focus of the parabola.

1. Why do you think this is the case?

Example

A car manufacturer wants to make the headlights of a car such that the actual light for the headlight is at a distance of 4 inches from the reflector. What is the equation of the parabola that models this headlight, assuming the vertex of the parabola is at the origin?

4 in

Light
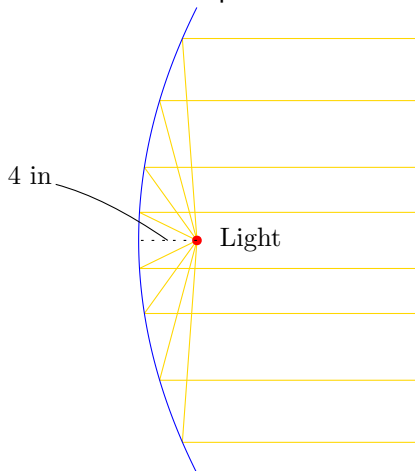
Example

A satellite dish is shaped like a paraboloid of revolution. This means that it can be formed by rotating a parabola around its axis of symmetry. The receiver is to be located at the focus. If the dish is 12 feet across at its opening and 4 feet deep at its center, where should the receiver be placed?

Example

One more application of parabolas is projectile motion. If we throw an object straight into the air with an initial velocity of v_0 feet per second and from a height of h feet above ground level, it can be shown using physics that the equation that tells you the height of the object (in feet) after t seconds is

$$s(t) = -16t^2 + v_0 t + h$$

Example

You throw a ball straight into the air (from the ground) with an initial velocity of 80 feet per second. What is the maximum height that the ball attains?

Example