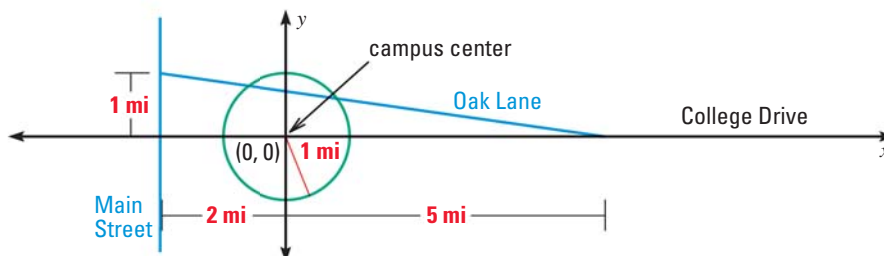


40. **BASEBALL** The path of a baseball hit for a home run can be modeled by $y = -\frac{x^2}{484} + x + 3$ where x and y are in feet and home plate is the origin. The ball lands in the stands, which are modeled by $4y - x = -352$ for $x \geq 400$. How far horizontally and vertically from home plate does the ball land?

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41. **MULTI-STEP PROBLEM** To be eligible for a parking pass on a college campus, a student must live at least 1 mile from the campus center.



- Write equations that represent the circle and Oak Lane.
- Solve the system that consists of the equations from part (a).
- For what length of Oak Lane are students *not* eligible for a parking pass?

EXAMPLES
3 and 4

on p. 660
for Exs. 42–43

42. **TAKS REASONING** A high school gym has a dome-shaped ceiling modeled by $x^2 + y^2 + 60y - 3456 = 0$ where x and y are in feet. A tennis player in the gym hits a shot modeled by $x^2 + y = 36$ where the origin is located at the base of the net. Solve the system of equations by both elimination and substitution. Do any solutions represent the ball hitting the ceiling? *Explain.*
43. **NAVIGATION** A ship's LORAN system locates the ship on hyperbolas with the given equations. Find the ship's location for each pair of hyperbolas. In part (b), assume the ship is west of the y -axis.

a. $x^2 - y^2 - 8x + 8 = 0$
 $y^2 - x^2 - 8y + 8 = 0$

b. $xy - 24 = 0$
 $x^2 - 25y^2 + 100 = 0$

44. **TAKS REASONING** A *seismograph* measures the intensity of an earthquake. A seismograph can determine distance to an earthquake's epicenter, but not direction. On January 22, 2003, a powerful earthquake struck Mexico's state of Colima. The diagram shows approximate distances from three seismic stations to the epicenter. The relative positions of the seismic stations are described below.

Mexico City: 700 miles south and 300 miles east of Lajitas

La Paz: 400 miles south and 400 miles west of Lajitas



- Model** Using Lajitas as the origin, write an equation of each circle. Let each unit represent 100 miles.
- Eliminate** Use the equation for the circle centered at Lajitas with each of the other two equations from part (a) to eliminate the x^2 - and y^2 -terms and find two new equations.
- Solve** Solve the system of linear equations that results from part (b) to find the coordinates of the epicenter.
- Reasoning** *Explain* why three stations are required to locate the epicenter.