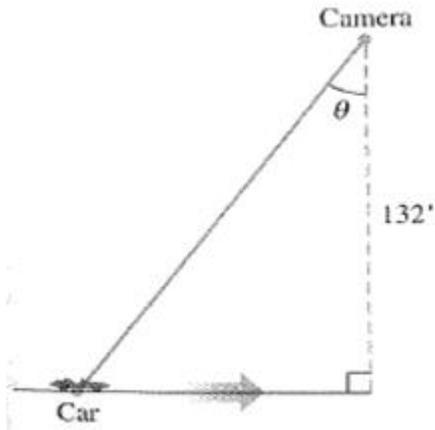


MA104 - Differential Calculus
Lesson 24: Problem Solving with Related Rates II

1. You are video taping a race from a stand 132 ft from the track, following a car that is moving at 180 mph (264 ft/sec). How fast will your camera angle θ be changing when the car is right in front of you? What about a half a second later?



2. A trough is 10 ft long and its ends have the shape of isosceles triangles that are 3 ft across at the top and have a height of 1 ft. If the trough is being filled with water at a rate of $12 \text{ ft}^3/\text{min}$, how fast is the water level rising when the water is 6 inches deep?

3. Two cars, car A traveling east at 30 mph and car B traveling north at 22.5 mph, are heading toward an intersection I. At what rate is angle IAB changing at the instant when cars A and B are 0.03 miles and 0.04 miles, respectively, from the intersection?
4. A highway patrol plane flies 3 mi above a level, straight road at a steady 120 mph. The pilot sees an oncoming car and with radar determines at that instant the line of sight distance from the plane to the car is 5 miles and that the line of sight distance is decreasing at a rate of 160 mph. Find the car's speed along the highway.