**Geometry and Sports**

1. According to *Popular Mechanics*, if you want to build a regulation size outdoor volleyball court in your backyard or in a park, you will need 177 feet of tape to outline the court. If the length of the court must be exactly twice the width of the court, find the length and width. *Source:* <http://www.popularmechanics.com/home_journal/how_to/4218238.html?page=2>
2. Connecticut is considering the construction of a new racetrack in order to attract a NASCAR franchise. In the plan for the infield of the track, a trapezoidal concrete area to park the trailers is needed. The area will look similar to the following diagram. The only thing the architects cannot decide is what the length of the shorter base should be. They need this length because it also will be the length of a fence on that side, which is next to the road. The plan calls for the area of the parking lot to be 72,500 square meters. Find the formula for the area of a trapezoid in a textbook or on the Internet. Use it to find the length of the shorter parallel side.

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 200 *m*

 450 m

1. You are in charge of helping to design a skate park in the center of your town. On [www.sk8parks.com](file:///C%3A%5CUsers%5CNicole%5CDropbox%5CAlgebra%20Materials%5CState%20Materials%5C2012-03-30%20Mentor%20Materials%5CMaterials%20for%20March%2030%20Meeting%5Cwww.sk8parks.com) you read that bank ramps are a good spot for beginners to practice simple moves. The particular bank ramp you are thinking about will look like the one below. On each side there is a two-dimensional right triangle. One of the acute angles of the right triangle will be four times as large as the other one. You remember from middle school that the sum of the angles in any triangle is 180°. So, what are the angle measures of the three angles in your triangle? Explain how you found your answer.



1. As in many high schools, football and soccer are played on the same field at Independence High. This makes painting the lines on the field tricky at times. Interestingly, while all football fields must be the same size, not all soccer fields are. The regulations for soccer fields call for them to be between 330 and 360 feet long and between 195 and 240 feet wide (click here for more info: <http://www.markersinc.com/athletic/soccer-field-dimensions.pdf>)

Since a football field is 360 feet long (including end zones), that works for both fields. The widths, however, are different. The soccer field is wider than the football field. The football field is centered inside the soccer field with the same distance on each side of the football field. The width of the football field is 6.4 times greater than the extra space on either side. If the width of the soccer field is 210 feet, what is the width of the football field?

1. Draw a sketch of the situation.
2. What do you choose to be the variable in this problem?
3. Write an equation to solve this problem.
4. Solve the equation. What is your answer?
5. Is your answer reasonable? Why or why not?