MATHCOUNTS® Problem of the Week Archive

Indianapolis 500 – May 14, 2007

Problems & Solutions

The month of May is a busy month at the Indianapolis Motor Speedway in Indianapolis, Indiana. Racing teams fine tune their cars and compete for the 33 starting positions. The race was first held on May 30, 1911 - Memorial Day - a grueling 500-Mile race paying $14,250 to win. The winner of the race in 2006 won $1,744,855.

The winner's share in 2006 is what percent of the winner's share in 1911? Express your answer to the nearest whole number.

*1,744,855 ÷ 14,250 × 100% = 12,244.59649%. Expressed to the nearest whole number, the winner's share in 2006 is **12,245**% of the winner's share in 1911.*

The track has four distinct turns and straightaways. The front and back straightaways are 0.625 mile each, while the "short chute" straightaways between Turns 1 and 2 and Turns 3 and 4 are 0.125 mile each. Each of the four turns is 0.250 mile long. What is the minimum distance a racecar travels to make one complete lap around the track?

*There are two straightaways at 0.625 mile each, two short chute straightaways at 0.125 mile each and four turns at 0.250 mile each. So, (2 × 0.625) + (2 × 0.125) + (4 × 0.250) = **2.500** miles.*

The speed records for 1 complete lap around the track and 4 complete laps around the track were set by Arie Luyendyk in 1996 when he qualified for the pole position at the start of the race. The pole position is the position closest to the center of the track in the first row. His time for 1 lap was 37.895 seconds and his time for 4 laps was 2 minutes, 31.908 seconds. What was his speed in miles per hour for this 1 lap? What was his average speed in miles per hour for these 4 laps? Express your answer to the nearest thousandth.

*The distance for 1 lap is 2.5 miles. Divide the distance by the time and convert seconds to hours: (2.5 miles ÷ 37.895 seconds) × (3600 seconds ÷ 1 hour) = 237.49835. Arie Luyendyk's 1-lap speed record is **237.498** miles per hour, rounded to the nearest thousandth. The distance for 4 laps is 10.0 miles. Convert the time to seconds: 2 minutes, 31.908 seconds = 151.908 seconds. Divide the distance by the time and convert seconds to hours: (10.0 miles ÷ 151.908 seconds) × (3600 seconds ÷ 1 hour) = 236.98554. Arie Luyendyk's 4-lap speed record is **236.986** miles per hour, rounded to the nearest thousandth.*

In 2006, Sam Hornish Jr. in car number 6 crossed the finish line 0.0635 of a second ahead of Marco Andretti in car number 26 in the closest finish for any Indy 500 race. If both cars were traveling at the constant speed of 243 miles per hour for the final 10 seconds of the race, how many feet ahead of car number 26 would car number 6 be when it crossed the finish line? Express your answer to the nearest whole number.

*0.0635 seconds × (243 mi/hr) × (1 hr/3600 seconds) × (5280 feet/1 mile) = 22.6314 feet. Sam Hornish Jr. in car number 6 would cross the finish line **23** feet ahead of Marco Andretti in car number 26.*

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