Evaluate: How important is a decimal place?

Name _____   **Period _____**   **Date _____**

The distance a car travels is found by multiplying the tire's circumference times the number of rotations. Remember that circumference is found by multiplying pi(π) times the diameter of the circle. The speed of a car is found by dividing the distance by the time it took to travel that distance. ($C = \pi d$)

> **Speed = (Circumference X # rotations) / time**
>
> 1 mile = 63360 inches;   to convert inches to miles, divide the # of inches by 63360

1. A car has tires with a 30 inch diameter. Every hour the tires rotate 3600 times. If a new car manufacturer decided to use $\pi = 3.0$, what would the calculated speed of the car be? (Divide the speed by 63360 to convert the answer to miles / hour)

2. What is the speed of the car using the real value of π? (Divide the speed by 63360 to convert the answer to miles / hour)

How do these two values compare? Is it OK for the car manufacturer to round pi to 3.0? Explain why or why not using the answers to 1 and 2.

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3. Car factories calibrate their cars' speed based on the tire size. When you change the size of the tire, you change the speed of your car. However, you cannot change the speedometer.

You buy a car with 32 inch diameter tires. If the axle rotates 20,000 times per hour, what is the speed of the car? (use the real value of pi)

(Divide the speed by 63360 to convert the answer to miles / hour)

You want bigger tires. You install 43 inch diameter tires. Your axle is rotating 20,000 times per hour. What is the speed of the car? (use the real value of pi)

(Divide the speed by 63360 to convert the answer to miles / hour)

The speed limit is 30 mph. The police pull you over. Are you going too fast or too slow? By how much? Show all of your work!

Explain what happens when the diameter of your tire is changed. Use data from problem 3 to explain the answer.

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