

MATH FOR PHYSICS

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Carmakers and White House Haggling Over Mileage Rules

WASHINGTON — The Obama administration and the auto industry are locked in negotiations over new vehicle mileage and emissions standards that will have a profound effect on the cars Americans drive and the health of the auto industry over the next decade and beyond.

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Compounding formula for Interest earned(I) :

$$P = P_0(1 + R)^N$$

P = "new" principle

P₀ = "old" original principle

R = decimal interest rate

N = number of periods(yrs)

INTRODUCTION: The production year of this NYTimes application is 2013 when the average US auto gas mileage is 24.8 mpg. Obama wants the auto mileage to be 56.2 mpg by 2025. This first proposal is a 5%(0.05)/year increase to reach 56.2 mpg. One could use the interest compounding formula (at left) to see if 56.2 mpg is achievable by 2025. Let P₀ = 24.8 , R = 0.05 , N = 12

QUESTION: (a) Find P = "new" 2025 projected gas mileage using P₀ = 24.8, R = .05 , N = 12(2025 -2013) ? (b) You will find in (a) that +5%/yr will not get USA up to 56.2 mpg by 2025. So, what %/year increase in MPG would get USA from 24.8 mpg in 2013 to 56.2 mpg in 2025?

HINTS: In (b) you could use the compounding formula, but you know: P₀ = 24.8 P = 56.2, N =13. R = ? . So, P =P₀(x)^N , solve for X where X = 1 + decimal form of yearly increase.

ANSWERS: (a) 44.54,thus 5%/yr misses goal.(b) X =1.0705, thus ~7%/yr. works.

Depending on the stringency of the standard, the deal could also **reduce global warming emissions by millions of tons a year and cut oil imports by billions of barrels** over the life of the

program, cornerstones of President Obama's energy policy. **The administration is proposing regulations that will require new American cars and trucks to attain an average of as much as (56.2 miles per gallon by 2025), roughly double the current level. That would require (increases in fuel efficiency of nearly 5 percent a year from 2017 to 2025.)**

A senior administration official, insisting on anonymity because the negotiations were continuing, said the 56.2 m.p.g. goal represented the government's opening bid, and might not be the final figure. The official said there was still some disagreement within the government, and the final outlines are far from certain.

The **United States has the world's most lenient vehicle emissions and mileage standards, lagging as much as 10 m.p.g. behind the (rest of the world).** Europe is expected to reach about **60 m.p.g.**

by 2020. But two years ago, when Chrysler and General Motors were clinging to life and the rest of the industry was slumping, carmakers agreed to **aggressive new nationwide fuel economy standards** covering the years 2012 to 2016. That deal, announced by President Obama in May 2009 as a dozen auto executives looked on, raises the domestic car and light truck fleet fuel economy to 35.5 miles per gallon by 2016.