Nov 10, 2015   **Mr.Bari**
Baker, Jevon   **Regents Physics (5th Period)**
Topic: Did Jevon Break the Law

Full question: Jevon went out to a bike trip for 1 hour and half long & his position function is : P(t) = 40/3 t^2. In 20 mile of the trip, he saw a speed limit sign..25 MPH. **Did Jevon Break The Law?**

Introduction:
Motion- the action or process of moving or being moved. Also simply the change of position of an object with the respect of time. For example, when Jevon changes his position from the beginning of his bike trip (t,d)= (0,0) to the end (t,d) = (30 mile, 3/2 hour), we call it as motion. Aristotle believed that the laws governing the motion of the heavens were a different set of laws than those that governed motion of objects here on the earth including the bike of Jevon. In his book, he hypothesized that heavier objects fall faster than a lighter objects. The scientific community accept his hypothesis over 2000 years which takes us to Isaac Newton who corrected his hypothesis. As the story goes, a 23 year old Newton was sitting under an apple tree, in 1665, as an apple fell on his head, he suddenly thought of the motion of in the earth and heavenly objects such as moon. In fact he asked a simple question, "If an apple fall, does the moon also fall". Newton's truly brilliant insight: if the force of gravity reaches to the top of the highest tree, might it not reach even further; in particular, might it not reach all the way to the orbit of the Moon. Isaac Newton had to invent Calculus to solve the falling moon problem; also invent two branches of motion (kinematics- that describes motion) and (dynamics- explains motion). In this essay, I will apply Algebra, Aristotelian physics and Newtonian Physics, and Calculus to investigate the following hypothesis: Jevon Broke the Law. The following 3 paragraphs: 1st-Mechanics, 2nd- Algebra,3rd- Calculus will help me investigate my hypothesis. In conclusion, I will use the result of these 3 paragraphs to either accept or reject my hypothesis.

Mechanics:
The mathematical study of the motion of everyday objects and the forces that affect them is called classical mechanics. Classical mechanics is often called Newtonian mechanics because nearly the entire study builds on the work of Isaac Newton. Kinematics is the science of describing motion using words, diagrams, numbers, graphs, and equations. Kinematics is a branch of mechanics. We will be using kinematics (position, time, velocity, acceleration) to further investigate my hypothesis. Dynamics is a branch of applied mathematics concerned with the study of forces and torques and their effect on motion. Dynamics is also a branch of mechanics. We will use dynamics (force) to further investigate my hypothesis.. In conclusion, I will use algebra, calculus, kinematics and dynamics to help me either accept or reject my hypothesis.

Algebra:
So we are trying to find out if Jevon broke the Law by using algebra to solve this problem.To begin, P(t)= 40/3 t^2. T (initial)= 0, D (initial)=0, T (final)=3/2, T2= 1.22, D (final)= ?, and D2=?.

HO: Did Jevon Break the Law? p(t)= 40/30t^2 p(3/2)=40/30(3/2)^2= 4/3*9/4, when you cancel the numbers out, it leaves 10*3= 30 mile. So d (final)= 30 mile. V=dF-di/Tf-Ti=30-0/3=30*⅔, when you cancel out the 30 and 3 leaves 10*2= 20 MPH. His average velocity was 20 MPH. The result of algebra is Aristotelian physics support the HO because Jevon was not moving faster than 25 MPH. We need to further investigate this case by using Newtonian physics and calculus.

Calculus:
The instantaneous velocity of the slope of the tangent to the position function. The result of the graph is p(t)=40/3t^2 (t, p(t) (1.2,20). Next we must find dF. p(t)=40/3t^2 p(3/2)=40/3(3/2)^2= 40/3*9/4 cancel everything out then we get 10*3= 30 mile. Now we must find V so V=Df-Di/Tf-Ti=30-0/3/2=20 MPH. Now we must find T2 so p(t)=40/3t^2 20=40/3t^2*3/40 cancel everything out t^2= 3/2 t= square root 1.5 finally t^2= 1.2. Finally p(t)= 40/3 t^2 we must use the power rule so p1(t)=2(40/3)t 2-1, p1(t)= 80/3t, p1(1.2)=80/3(1.2)= finally 32 MPH. So that concludes Jevon broke the Law.

Conclusion:
So in conclusion, Jevon broke the law because he was moving faster than 25 MPH, to be precise 32 MPH. I'm forced to accept my hypothesis because Jevon was moving faster than 25 MPH when he was passing the speed limit.