The Spring 2012 Pedaled Boxcar Challenge

Rules for the Challenge:

1. Your car must be of your group's own design, BUT can be based on or modified from any design already made or drawn up. Note: The race course will be designed by Mr. Alvarez' former PAP Algebra II Students. **Double Elimination for your car will be in effect.** A bracket will be maintained during the Derby.
2. A maximum of $60 dollars is allowed for new materials to be purchased for the car. Everyone in the group must contribute evenly for these parts or donate any used or recycled materials used in the car. All receipts will be kept and copies of them will be turned in with the plans, along with a picture of the parts purchased and used in making the car.
3. New and or used parts can be used to make the car. The recycled materials MUST be **PRE-APPROVED** by Mr. Alvarez before they can be used. A picture can be taken of the items being used, but only after **PRE-APPROVAL** is received that you will be able to use them for your car. Also the donating party of the parts must sign a release form.
4. It must be a pedaled vehicle, no wind or motor power allowed for use in the car.
5. The car must not exceed @**A** feet in length. The car must not exceed **@B** feet in width. The car must not exceed **@C** feet in height, including the top of the driver's helmet. This will be **STRICTLY** enforced. If your car exceeds these dimensions, it will be disqualified from the race.
6. Driver must wear a Helmet during all races. It can be a motorcycle helmet, biker's helmet, football helmet, etc. etc..
7. Driver must be at least **16** years old. (Legal age for driving a car in Texas)
8. Car must have at least of **4** wheels.
9. One member of the group **must** be a historian for the group and take pictures, video, and gather info to present to the class. They must create a video to not exceed 5 min of their group's adventure in creating their car using a program **like** Windows Movie Maker.
10. Parents **ARE** allowed to participate in any way possible, but are **NOT** allowed to take over the project.
11. You are to have fun at all times. If you don't, your group will be disbanded, and you will be assigned another project to do individually.
12. There will be **4 Quiz Grades** given out for this project. **1. Can your car travel 900ft? 2. Design to model to factory. (The Blueprints of the car must be created on a CAD program) A scaled model must also be created that looks exactly like the CAD designed boxcar. From what you designed, how close were the model and the car that you built to its blueprints? Were the blueprint dimensions close to actual? 3. Each member of the group will grade each other and themselves in their participation in making the car. 4. A 3 to 5min video documenting the evolution of the car being made will be created by the historian. The date schedule for updates on the car project will be handed out for your info and also a countdown to race day on the www.boxcarchallenge.com homepage. (Note: The race is NOT for a grade. It is for bragging rights to be the fastest car for Spring 2012.Trophies will be awarded to 1st 2nd and 3rd place.)**
13. If you have been on a Race Team in previous semesters and you will still be a part of that team for this race for Spring 2012, then you will automatically be assigned the paper project.
14. This Race will be what is called an "OPEN" registration race, which means that ANY CAR from previous semesters will be allowed to race. You will be facing the cars from previous semesters for bragging rights to being the Best and the Fastest. **(Note: if all members of a former race team have graduated, then their car will not be allowed to race.)**
15. This Boxcar Derby is **NOT** mandatory, but a major project is. If you decide not to participate, an equivalent project will be assigned to you. This is the Pedaled Boxcar Challenge. Are you in? If you are, **Sign Here**_____.

*** Purpose of the Project:** You will be given lessons in the physics of motion that ties into math and the Derby. You will craft something that is directly created by the math that you are studying. We will breathe life into math and see how shape, angles, sprockets, chains, and pedals can affect motion of objects and their velocity. Measuring, designing, cutting, welding, time managing, being part of a team, using math in different and unique ways to create a fast and dynamic car filled with engineering concepts and ideas, is what the Pedaled Boxcar Challenge is all about.

@A Using the area (x) of the famous Hawk, seen by thousands seasonally, solve for this equation to get the car's length in feet.

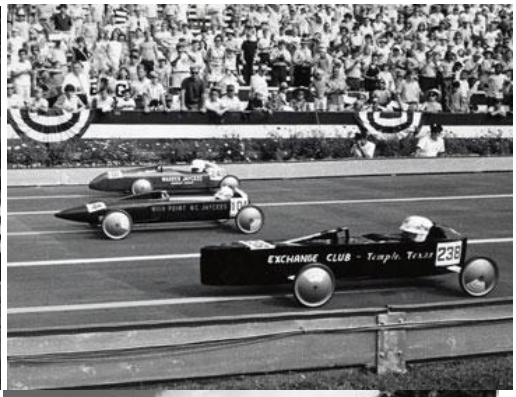
$$\frac{\frac{x}{7}}{\frac{x+2}{x-4}+\frac{2}{x}+\frac{5x}{3x-1}}$$

@B Using the diagonal (x) of the basketball court, solve for this equation to get the car's width in feet.

$$\frac{-1}{\tan x} - \frac{1}{\cos x} - \sin x$$

@C Using the height (x) of the Hawk flagpole, solve this equation to get the car's height in feet.

$$\mathbf{1/3 \log_3 2x + 2 \log_3 17 - x/75}$$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