

ICTCM

WeBWorK at U of R

“Ask the questions you should, not just the ones you can”

Since 1996



WeBWorK is an open source on-line homework system. It provides:

- **Instant feedback!**
- **Different version** of question for each student.
- Library of more than 35K math/science problems.
- Hints and solutions can be included in problems.
- Email the instructor if you’re stuck.
- Authors have ability to **devise new question types** and new response evaluators
- The **exploration** of the potential of on-line homework is **just beginning**.

Scaffolded problems can guide in-class active learning sessions

(1 point) **setLinearOptimization/food.pg** Show Problem Source

Part 1: Poke at the problem to figure it out

You are allowed to eat from the following menu: A hamburger, a chicken sandwich, a fish sandwich, and a deluxe cheeseburger. The goal is that your meal must satisfy certain percentages of the USRDA of Vitamin A, Vitamin C, Calcium and Iron and have the fewest number of calories. Here is the information you need.

Food	%vitaminA	%vitaminC	%calcium	%iron	calories
hamburger	4	4	10	15	250
chicken	8	15	15	8	400
fish	2	0	15	10	370
cheeseburger	15	6	30	20	450
requirements	8	11	15	14	

You can eat a fraction of a sandwich -- you don't need to eat the whole thing.

Just to be clear -- I made these requirements up for this problem. You can look up the real RSDA if you wish.

Find some reasonable meal that meets the USRDA using the chart above. Enter the number of each type of sandwich. (You can use fractions and decimals and your calculator. :-). Don't leave an answer blank empty, use 0 instead.

Hamburger: Chicken: Fish: Cheeseburger:

Now make a second guess that meets the requirements and has fewer calories.

Hamburger: Chicken: Fish: Cheeseburger:

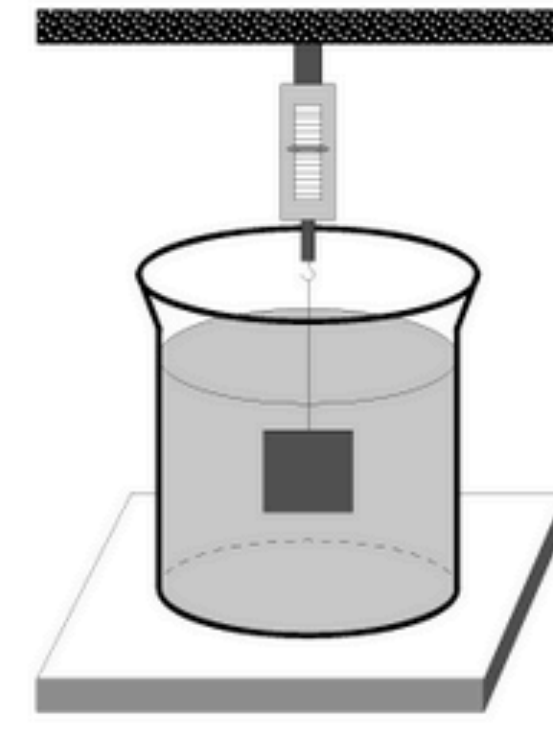
From this information alone you can conclude that the best diet you can create from these sandwiches will have ? calories.

Solution:

- Section 2: Expressing this problem with equations
- Section 3: How close are we to the best possible diet?
- Section3a: continued
- Section4: More exploring

Physics

(1 point) **Contrib/CAPA/type32/prob03.pg**
A 3.5 kg block of some unknown material is suspended from a spring scale and submerged in water. The spring scale reads 27.9 N.



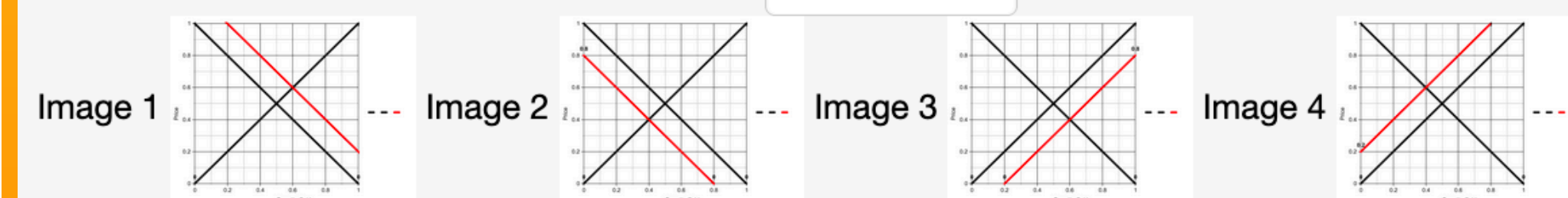
What is the specific gravity of the block?

What is the density of the block?

Economics

(1 point) **ECO_Problem_Sets/1-Demand_Supply_SimpleGraphs/prob1.pg**
If the price of ice cream rises and the quantity sold also rises, which curve must have moved - supply or demand?
Choose the graph that represents the change, where the red line is either the new supply or demand curve.

Enter the number corresponding to the image:



for ECE and ME and more use QR code

We knew we would make mistakes in the WeBWorK design so we built a very open architecture with plugins and callbacks.

“WeBWorK was built on freely available web technology, and the software is claimed to be used by more than 240 colleges and universities. Combining technologies in this way, rather than writing dedicated desktop software, was rather innovative at the time. The module construction and extensibility, both of the underlying mathematical software and front end, have enabled WeBWorK to evolve more or less continuously for the last fifteen years.”

Computer Aided Assessment of Mathematics,

— Chris Sangwin, 2012

In 2016 Michael Gage and Arnold Pizer received the AMS “Award for Impact on the Teaching and Learning of Mathematics” for their development of WeBWorK and TheWeBWorKProject support community.

Yeah for the green bar!!!

<https://www.facebook.com/The-Green-Bar-You-Get-When-All-the-Answers-are-Correct-106246586078386/>

Entered	Answer Preview	Result
2*tan(2*a*x+C)	2 tan(2ax + C)	correct

The answer above is correct.

(1 point) Solve the differential equation

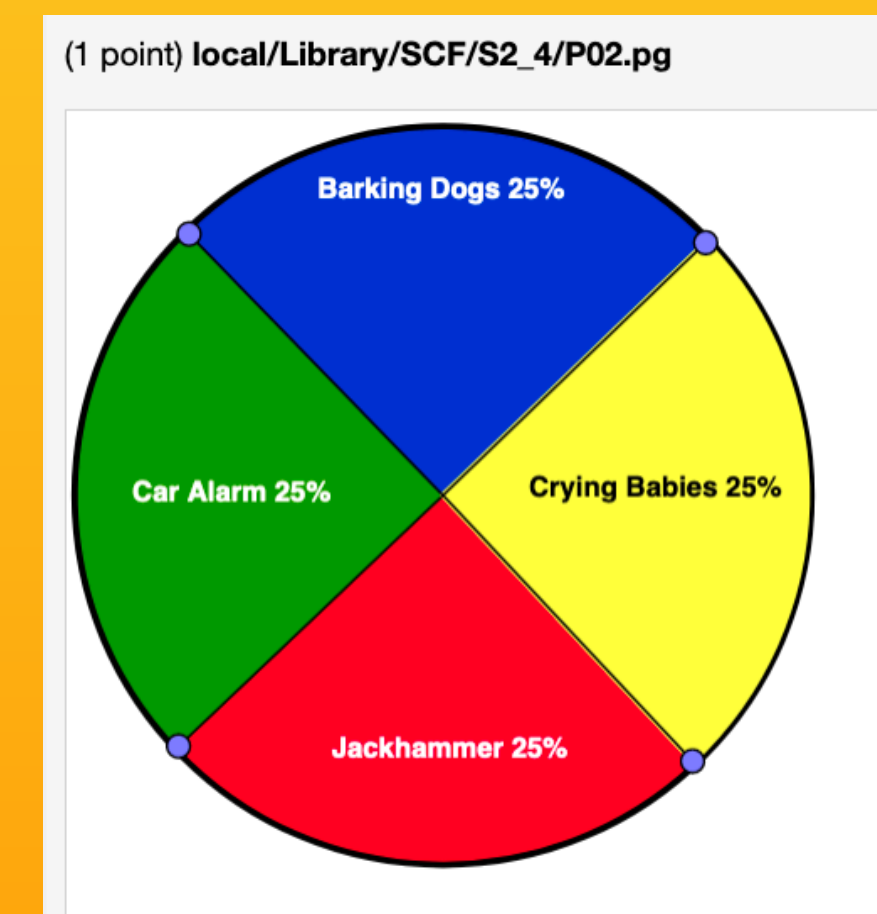
$$\frac{dR}{dx} = a(R^2 + 4).$$

Assume a is a non-zero constant, and use C for any constant of integration that you may have in your answer.

R =

[Solution:](#)

Geogebra + WeBWorK is a great combination



return this question to its initial state

A sample of 1000 adults are surveyed about what noise they find most annoying.

The following are the results of at survey.

Jackhammers 290
Car Alarms 210
Barking Dogs 290
Crying Babies 210

Move the points on the pie graph above to represent this distribution.

From an anonymous survey in 2004:

Please use this space for additional comments regarding WeBWorK.

One student made the following comments:

Personally, I think WeBWorK is the greatest teaching tool created.

- 1) It allows me to know instantaneously whether I got the right answer.
- 2) It forces me to learn the material at an earlier time as opposed to right before the test.
- 3) Since you can also access other problems through other users (i.e., practice1, practice2, etc.) it really prepares me well for tests. I don't know what I would do without it.
- 4) I think that without WeBWorK, I would not be doing as well as I am in the course (A+). Because WeBWorK problem sets involve material that we have just covered in class, we are prepared very well. I thought I would never see the day when Math would become my best class. Though, I firmly believe that my success is due to the excellence of the teaching (Professor Benedetto is the best Math professor I've ever had) and the WeBWorK program.

WeBWorK has come a long way since last semester.[fall 2004] They've fixed the problems I had with it by making the syntax easier to put in and the preview option.

Some types that can be checked with current response evaluators. (for math&science)

- Real and complex numbers - to specified accuracy
- Functions - of one or more variables: ($x^3+5x-4+\sin x$)
- Numbers or functions with units (500 cm or 5 m)
- Anti-derivatives -- up to a constant
- True-False, multiple choice, short answer
- Solutions to non-homogeneous ODE up to a solution of the homogeneous ODE
- Eigenvectors, parallel vectors, vectors lying in a given span
- Independence of a set of vectors

(1 point) **Library/Union/setMVElevelsets/levels-5/levels-5c.pg**

Indicate the number of each type of critical point for the surface shown at the left.

4	relative maxima
1	relative minima
4	saddle points

Drag the surface to rotate it