=KEY=

Welcome to the homework page, test1. If this isn't you then please go back to the homework login page.

You may log out and return later if you wish without losing any saved data. You will have **TEN** attempts for each assigned problem. Every unsuccessful attempt will lower that part of the problem's value by 5%.

For example, if you get it right on the first try, then you will receive 100% for that problem. If you are twice incorrect and submit the correct on the third try, then you will receive a 90% for that part of the problem. You will not recieve any points for that part of the problem after 10 attempts.

You do not have to answer all the problems during a single session or in any particular order. To answer a problem simply type the numerical value in the box provided, check the box to the right of the part(s) you want to answer, and then click the submit button. You can freely log in and out of the homework page without losing any submitted information so feel free to take breaks if necessary.

LETS BEGIN!

Problem #1

(a) A new computer chip is made up of 2.3 billion transistors on the surface of a silicon chip that is 0.261 cm by 0.313 cm. If printed at this density on a surface that is 1m x 1m, how many transistors would that carry? (b) Assume that each transistor is a little square on the surface. Compute the length of a side of one of these transistors.

.00261M .00313M

$\frac{\#}{M^2} = \frac{2.3\times10^9}{(.00261M)(.00313M)}$

$= 2.815\times10^{14}\ \#/M^2$

(a) 2.815 E 14 ☐ Answer part (a)

(b) 59.6 nm ☐ Answer part (b)

so $\frac{1}{2.815\times10^{14}} = 3.55\times10^{-15}\ \frac{M^2}{TRAN}$

$= \ell^2$

$\Rightarrow \ell = 5.96\times10^{-8}M = 59.6nM$

Submit

Attempted part (a) 0 times and part (b) 0 times.

There have been no attempts to answer part (a)

There have been no attempts to answer part (b)

Problem #2

(a) Suppose that your lung capacity is 1.28 liter. The lung is made of aveoli (little spherical sacs) each about 151.68 microns in diameter. Compute the total number of aveoli in your lungs.

(b) Now all the gas exchange (oxygen/carbon dioxide, etc) that your life depends on happens across the surface of the aveoli. Using the above data compute the area of all your aveoli together in terms of football fields. A regulation football field is 100 yards long and 53 and 1/3 yards wide. Go Penguins!!

(a) 7.00E8 # Answer part (a)

(b) 0.01128 Football Fields Answer part (b)

Submit

Attempted part (a) 0 times, part (b) 0 times.

There have been no attempts to answer part (a)

There have been no attempts to answer part (b)

Problem #3

(a) You decide to have THE RAGER TO END ALL RAGERS and invite the whole earth. There are 7.54 billion people...lots of people. No problem! You decide to have it at your Dad's ranch which is a circle 29.27 Km in radius. What percentage of it does the party occupy sitting on 19.2 cm by 33.46 cm chairs?

(b) Suppose that the earth has a radius of 6033.665 Km. Use the above number to determine the area of land per person, BUT use the fact that only 27.06 % of the earth is not covered in water. Suppose that each was given this area as a square. How big would it be on a side?

(a) 18.0 % Answer part (a)

(b) 128 m ☐ Answer part (b)

$A_{EARTH} = 4\pi R_E^2$
$= 4\pi(6033000)^2$
$= 4.57\times10^{14}\ m^2$

Submit

$A_{LAND} = .2706\, A_{EARTH} = 1.24\times10^{14}\ m^2$

Attempted part (a) 0 times and part (b) 0 times.

$\frac{A_{LAND}}{PERSON} = \frac{1.24\times10^{14}\ m^2}{7.54\times10^{9}} = 16418\ m^2/PER$

There have been no attempts to answer part (a)

There have been no attempts to answer part (b)

$l \times l =$ ⇒ So $l = \sqrt{16418}$
$= 128\ m$

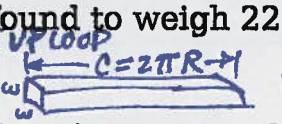
Problem #4

$= .1124\ m$

We find a bracelet of unkown material. It is a solid hoop 11.24 cm in radius, and has a square crossection of 1.067 mm on a side. It is found to weigh 22.404 grams. $= .022404$

$= .001067\ m = w$

OPEN UP LOOP



$V = "l \cdot w \cdot h"$
$= 2\pi R \cdot w \cdot w$

(a) What is the density of the bracelet material ?
(b) Were a duplicate of it to be made of depleted uranium (everyone's favorite jewelry material...in North Korea!) how much would it weigh in grams?

$V = 2\pi(.1124)(.001067)$
$V = 8.036\times10^{-7}\ m$

(a) 27878 Kg/m^3 ☐ Answer part (a)

$DENSITY = \frac{M}{V} = \frac{.022404\ kg}{8.036\times10^{-7}}$

(b) 15.35 g ☐ Answer part (b)

$DENSITY = 27878\ kg/m$

Submit

$VOLUM = \frac{M}{DENS}$ FIXED ⇒ $\frac{M_1}{DENS_1} = \frac{M_2}{DENS_2}$

Attempted part (a) 0 times and part (b) 0 times.

$\frac{.022404}{27878} = \frac{M}{19100}$

There have been no attempts to answer part (a)

⇒ $M = .01535$

There have been no attempts to answer part (b)

Problem #5

A new planet is found that is earth-like. It has a radius of 6077.93 Km and suppose that 45.07 % of it is covered in water to an average depth of 2577.93m, determine the number of megagallons of water per person on the earth. Use 5.07 billion for the population of the earth.

AREAS $A_{OCEAN} = .4507\, A_{PLANET}$ $V_{OCEAN} = A_{OCEAN} \cdot DEPTH$

⇒ $V_{OCEAN} = .4507(4\pi(6077.93\times10^3)^2)(2577.93) = 5.4\times10^{17}\ m^3$ ⇒

Km m

28143 megagallons ☐ Answer to the question

Submit

$\text{PER PERSON} = \frac{V}{\#} = \frac{5.4\times10^{14}\,m^3}{5.07\times10^{9}}\left(\frac{1000\,l}{1\,m^3}\right)\left(\frac{1\,GAL}{3.78\,l}\right) =$

28143 MGAL

Attempted the problem 0 times.

There have been no attempts to answer the problem

Problem #6

(a) I have two boxes, identical in shape, but second one has a single side that is 2.3 times as long as the corresponding side on the first box. What is the ratio of the volumes of the first box to the second one?
(b) What is the ratio of the areas of the first box to the second one?
(c) A beach ball has 318.7 times the volume of a tennis ball. What is the ratio of their radii (what multiple of the tennis ball radius is the beach ball)
(d) Using part (c) data, what is the ratio of their surface areas?

(a) .082 ☐ Answer part (a)

(b) .189 ☐ Answer part (b)

(c) 6.83 ☐ Answer part (c)

(d) 46.65 ☐ Answer part (d)

Submit

$V = lwh$

IF SIMILAR SHAPE

$V_2 = (2.3l)(2.3w)(2.3h)$

$V_2 = (2.3)^3 lwh = (2.3)^3 V_1$

SO $\frac{V_1}{V_2} = \frac{1}{(2.3)^3} = .08$

SIMILAR REASONING $\frac{A_1}{A_2} = \frac{1}{(2.3)^2} = .1$

$\frac{V_{BB}}{V_{TB}} = 318.7 = \frac{\frac{4}{3}\pi R_{BB}^3}{\frac{4}{3}\pi R_{TB}^3} = \left(\frac{R_{BB}}{R_{TB}}\right)^3$

SO $\frac{R_{BB}}{R_{TB}} = (318.7)^{1/3} = 6.83$

Attempted part (a) 0 times, part (b) 0 times, part (c) 0 times, and part (d) 0 times.

There have been no attempts to answer part (a)

There have been no attempts to answer part (b)

There have been no attempts to answer part (c)

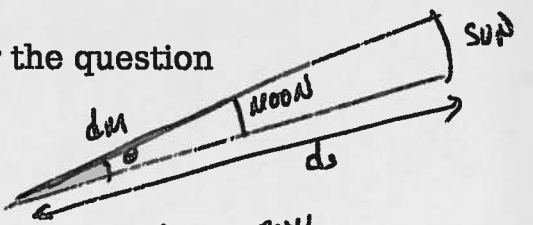
There have been no attempts to answer part (d)

Problem #7

Suppose the Moon is 1.044 light seconds away from the earth, and the sun is 7.231 light minutes. = 434.9 LIGHT SECONDS
(a) Use the fact that there are total solar eclipses (draw the picture!) and that the moon has a diameter of 1578.309 Km to compute the diameter of the sun (in Km).

657000 ☐ Km. Answer the question

Submit



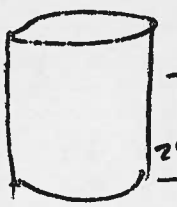
$\frac{MOON}{d_M} = \frac{SUN}{d_S}$ ⇒ SUN = 657000 ✓

Attempted the problem 0 times.

There have been no attempts to answer the problem $\frac{1578.31}{1.044} = \frac{SUN}{434.9}$

Problem #8

A large cylindrical water storage tank 3.5 m high and 1.5 m in radius is leaking at a rate of 3.4 gallons per minute. (a) Compute the volume of the tank in m^3?
(b) How long will it take to completely leak out?



$\pi R^2 h = V$
$\pi(1.5)^2(3.5) = V$
$24.7\,m^3 = V$

(a) 24.7 m^3 ☐ Answer part (a)

(b) 1.34 Days ☐ Answer part (b)

Submit

$(24.7\,m^3)\left(\frac{1\,MIN}{3.4\,GAL}\right)\left(\frac{1\,GAL}{3.78\,L}\right)\left(\frac{1000}{1\,m^3}\right)$
$\times\left(\frac{1\,HR}{60\,MIN}\right)\left(\frac{1\,DAY}{24\,HR}\right) = 1.34$ ✓

Attempted part (a) 0 times and part (b) 0 times.

There have been no attempts to answer part (a)

There have been no attempts to answer part (b)