Temporary website with syllabus & HW at: evantilton.com/ph202af19

Day 2, August 28, 2019

PH 202A

Reminders about what's coming up.

- **For Friday:**
  - Read OpenStax College Physics Sections 2.1, 2.2, and 2.3
  - Complete Reading Survey by 8am
  - Complete the pre-course survey at **evantilton.com/ph202af19** by Friday at 9am for **bonus** homework credit
  - HW#1 is due at the *start* of class!
    - Note that I fixed a critical typo in number 2!

Don't wait to get help if you are getting lost or are having problems! Come talk to me!

I'll often show or refer to your comments on the reading surveys. I'll always make them anonymous. For example:

"I have seen all the major points from chemistry. But they weren't as strict with sig figs so that's something i'll have to work on."

"I like plug and chug type problems."

"I am feeling a little bit nervous about the class."

"I'm also worried on how I will do in the class "

(and many similar comments)

Last time... How will you be graded?

- 40%   Homework – posted on WorldClass, submitted on paper, see syllabus...

- 30%   3 midterm exams

- 15%   Final exam

- 15%   Participation

Let's try these things...

How's the homework going?

A. I haven't started.

B. I've started, it's going fine.

C. I've started, I'm having some struggles.

D. I've finished it.

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This is not how we'll usually use these.

Models!

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We make models of differing complexity depending on our needs.

"I think the most interesting thing about the reading is the Limits on the Laws of Classical Physics because I never learned about it before."

Unit conversions

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one

Concept Question

Let's make up some units. Maybe I have branola worth of stuff. A branola, it turns out, is the same as 10 kiloronorts. A ronort, of course, is equal to 100 clartes.

Which of the following conversion factors is **not** valid, i.e., which is not equal to one?

A. (1 ronort)/(100 clartes)

B. (10000 ronorts)/(1 branola)

C. (1 branola)/(10000 ronorts)

D. (1 kiloronort)/(10 clartes)

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Concept question

- From last question:
  - 1 branola = 10 kiloronorts
  - 1 ronort = 100 clartes

What is 1 clarte in branolas?

A. (1/1,000,000) branolas

B. 1,000,000 branolas

C. 100,000 branolas

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$1\ clarte \cdot$

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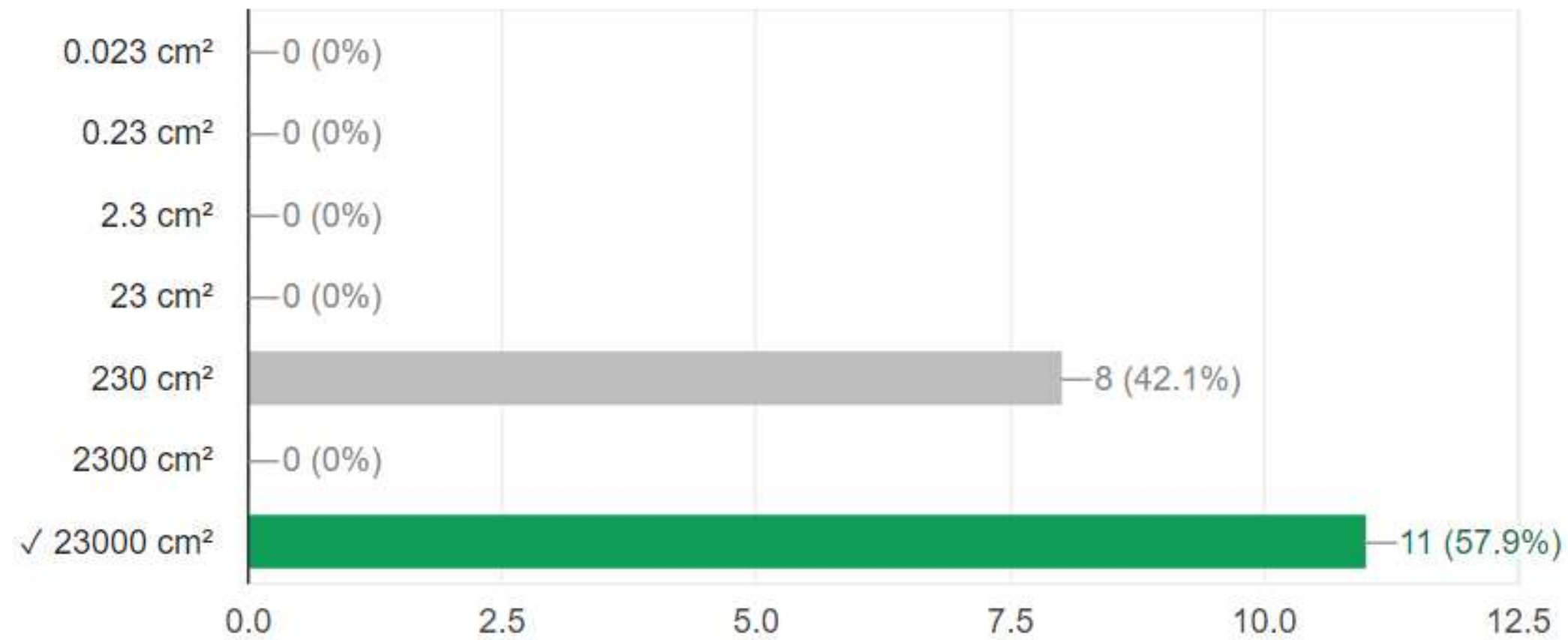What is 1 clarte in branolas?

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Suppose you have a poster that has an area of 2.3 m². What is the area of the poster in cm²?

11 / 19 correct responses

2.3 m^2 in cm^2

All · Shopping · Images · News · Videos · More · Settings · Tools

About 200,000,000 results (0.65 seconds)

Area

| 2.3 | = | 23000 |
| Square meter | | Square centimeter |

Formula   multiply the area value by 10000

Google

(2 N)/(7.8e-3 kg) in fathoms/fortnight^2

All   Shopping   Maps   Videos   News   More   Settings   Tools

About 5 results (0.59 seconds)

(2 N) / (7.8e-3 kg) =

$2.05141127 \times 10^{14}$ fathoms / (fortnight^2)

More info

Dimensional analysis

The single most important time to use it is to **check your answers!**

When someone is new to physics, they usually like to skip this. Don't! (Look at the plausibility category of homework grading...)

(Corollary: Many physicists like to *only* do this step!)

The main idea of dimensional analysis:

Both sides of an equation must have the same units.

Put another way, each term of an equation must have the same units.

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- Similarly, since pure numbers are unitless, things you add to them have to be unitless, e.g., $[1 + m/M]$ works because the kilograms cancel.

Concept question

Assume D and R have units of meters, T has units of seconds, m and M have units of kilograms, v has units of meters per second, and g has units of m/s². Which of the following formulas has self-consistent (i.e., valid) units?

A. $D = mR^2$

B. $m = M[1 + R^2]$

C. $D = [1 - m/M]gT^2$

D. $g = mv^2/R$

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