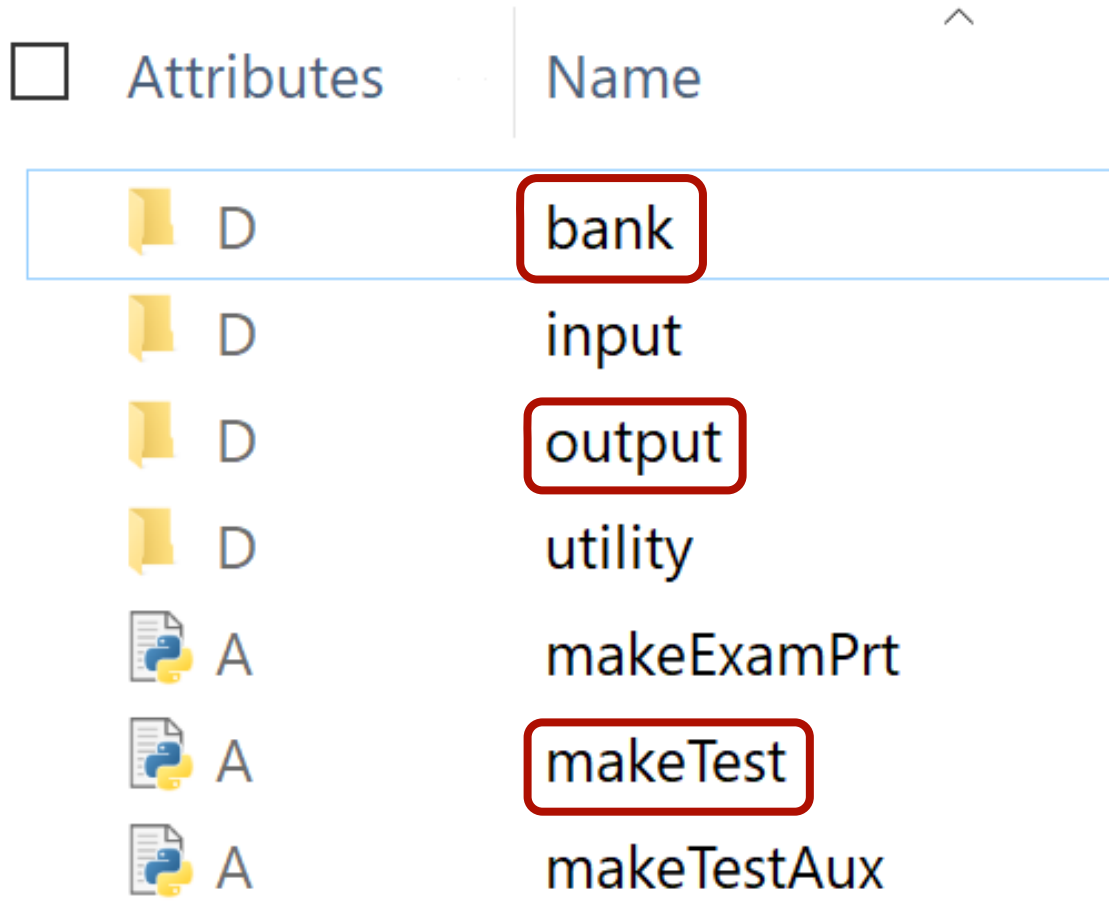
For more info Google:

Wikiversity quizbank

Prototype Quizbank for Physics & Astronomy

(Python / LaTeX)



All this is freely available under a Creative Commons license

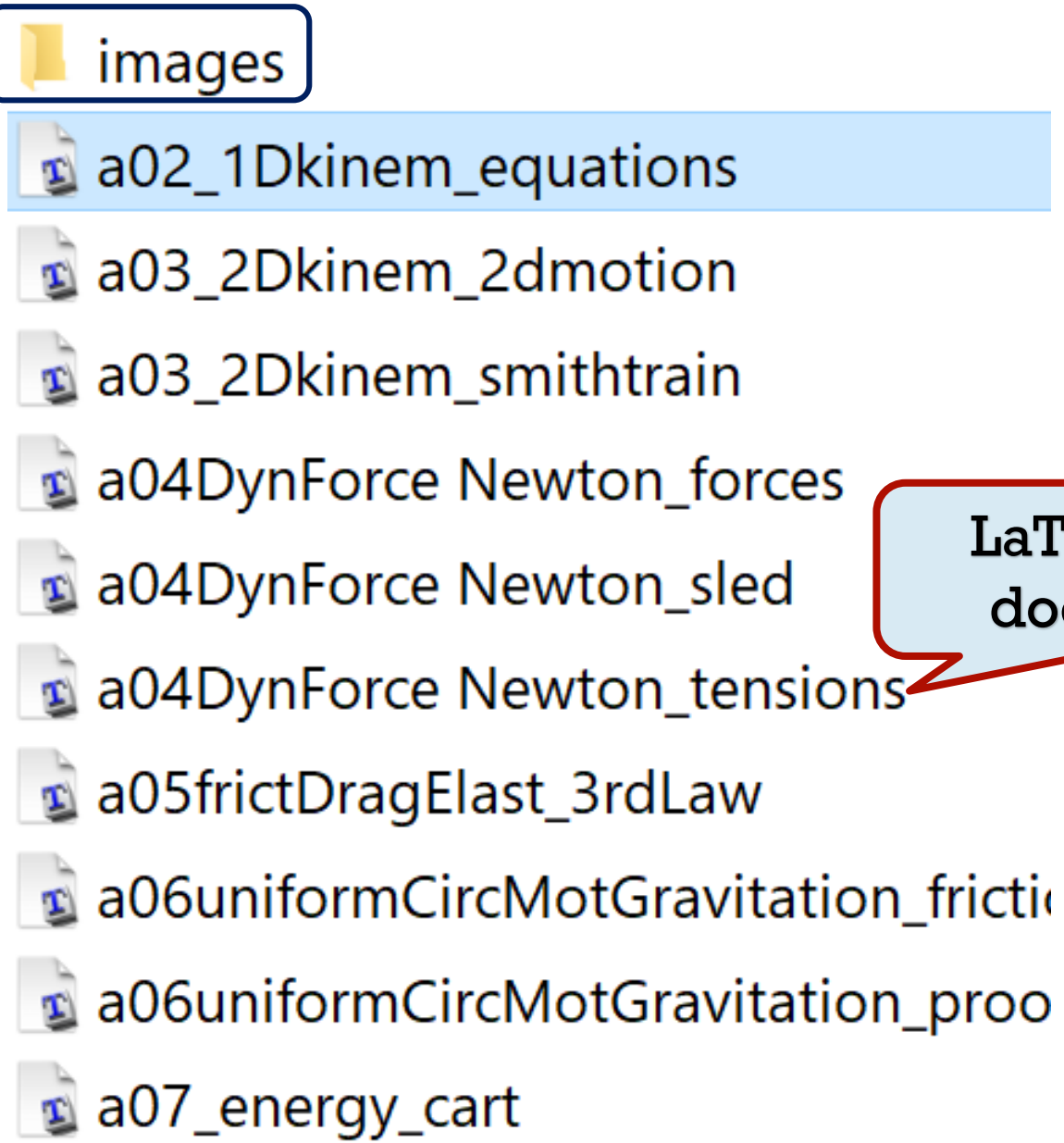
Guy Vandegrift
Wright State University, Ohio

For more info Google:

Wikiversity quizbank

75 images
102 quizzes
1008 questions

(as of 8/1/19)



```
\question
\includegraphics[width=0.25\textwidth]{images/Threetensions.png}
In the figure shown, \straighttheta\textsubscript{1} is 18 degrees, and
\straighttheta\textsubscript{3} is 34 degrees.  The  tension
T\textsubscript{3} is 24 N. What is the tension, T\textsubscript{1}?
\ifkey\endnote{a04DynForce Newton\_tensions\_1 placed in Public
Domain by Guy Vandegrift: {\url{https://en.wikiversity.org/wiki/
special:permalink/1863118}}}\else{}\fi
\begin{choices}
\choice 15.82 N.
\choice 18.19 N.
\CorrectChoice 20.92 N.
\choice 24.06 N.
\choice 27.67 N.
\end{choices}
```

This is LaTeX script

For more info Google:

Wikiversity quizbank

The 5-question quiz "Newton_tensions" is numerical uses two figures.

In the figure shown, θ is 21 degrees, and the mass is 3.1 kg. What is T_2?

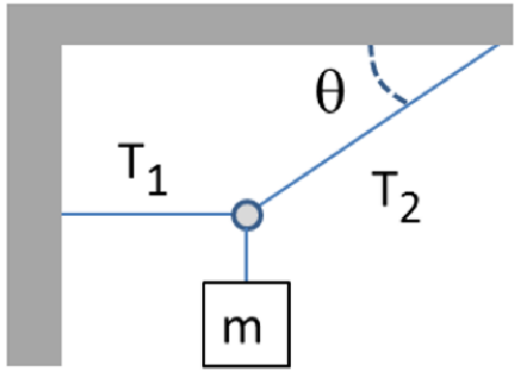
A. 55.74 N.

B. 64.1 N.

C. 73.72 N.

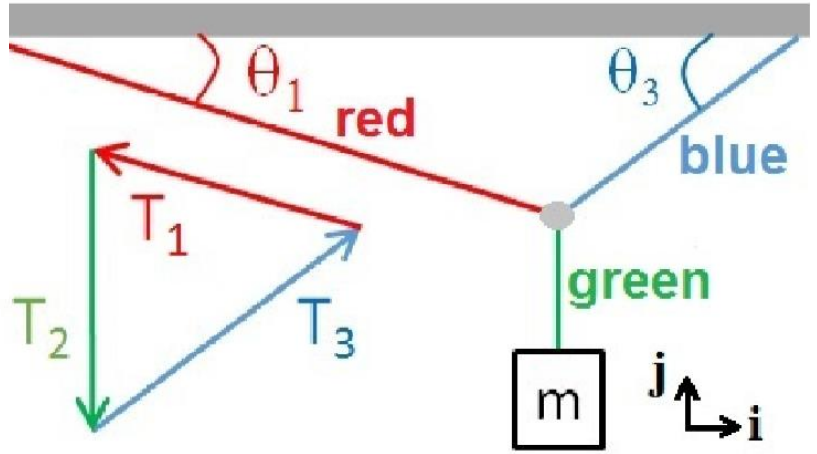
D. 84.77 N.

E. 97.49 N.



In the figure shown, θ_1 is 15 degrees, and θ_3 is 37 degrees. The tension T_3 is 22 N. What is the tension, T_1?

In the figure shown, θ_1 is 17 degrees, and θ_3 is 30 degrees. The tension T_3 is 46 N. What is the tension, T_1?

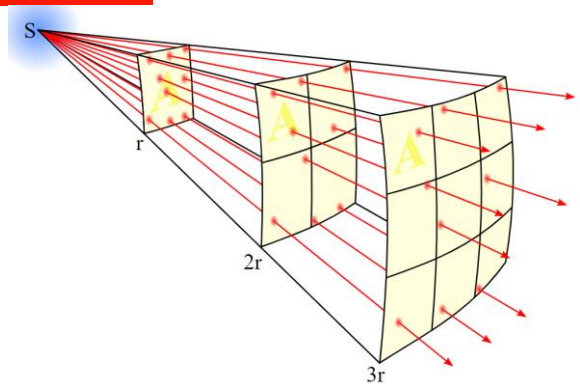


Numerical questions use random input variables

True-False questions can be useful

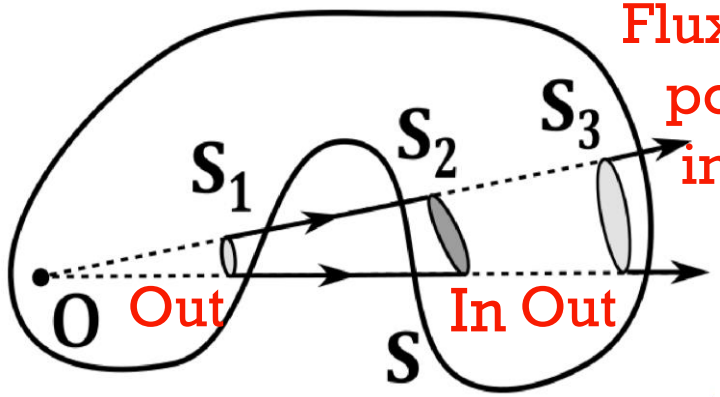
In this description of the flux element, $d\vec{S} = \hat{n}dA_j$ (j=1,2,3) where $\hat{n}$ is [illegible]l, and a positive charge is assume[illegible]e the Gaussian surface shown. The field lines exit at S_1 and S_3 but enter at S_2.

These are what I call cluster questions



- In this figure, $dA_1 = dA_3$
- In this figure, $\vec{E}_1 \cdot d\vec{A}_1 = \vec{E}_3 \cdot d\vec{A}_3$
- In this figure, $\vec{E}_1 \cdot d\vec{A}_1 + \vec{E}_2 \cdot d\vec{A}_2 = 0$
- In this figure, $\vec{E}_1 \cdot d\vec{A}_1 + \vec{E}_3 \cdot d\vec{A}_3 = 0$
- In this figure, $|\vec{E}_1| \cdot |d\vec{A}_1| = |\vec{E}_3| \cdot |d\vec{A}_3|$
- In this figure, $|\vec{E}_1 \cdot d\vec{A}_1| = |\vec{E}_3 \cdot d\vec{A}_3|$

(Key: F, T, T, F, F, T)



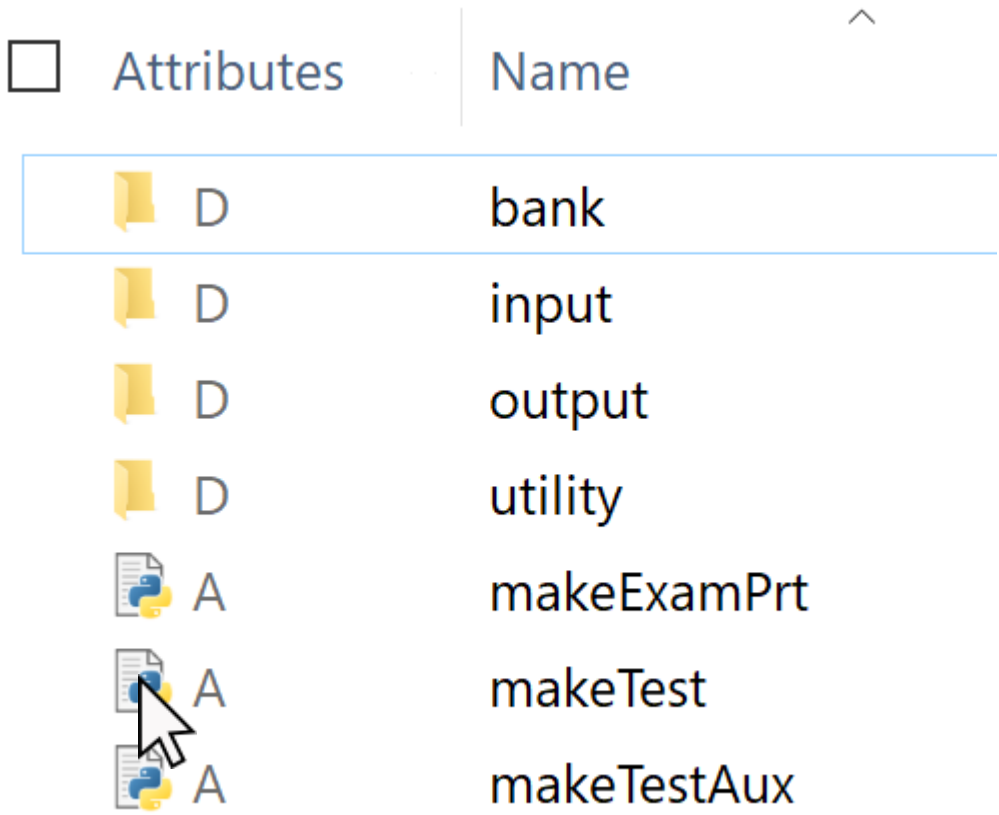
Flux cone from point charge inside surface

For more info Google:

Wikiversity quizbank

To make an exam:

Click *makeTest*

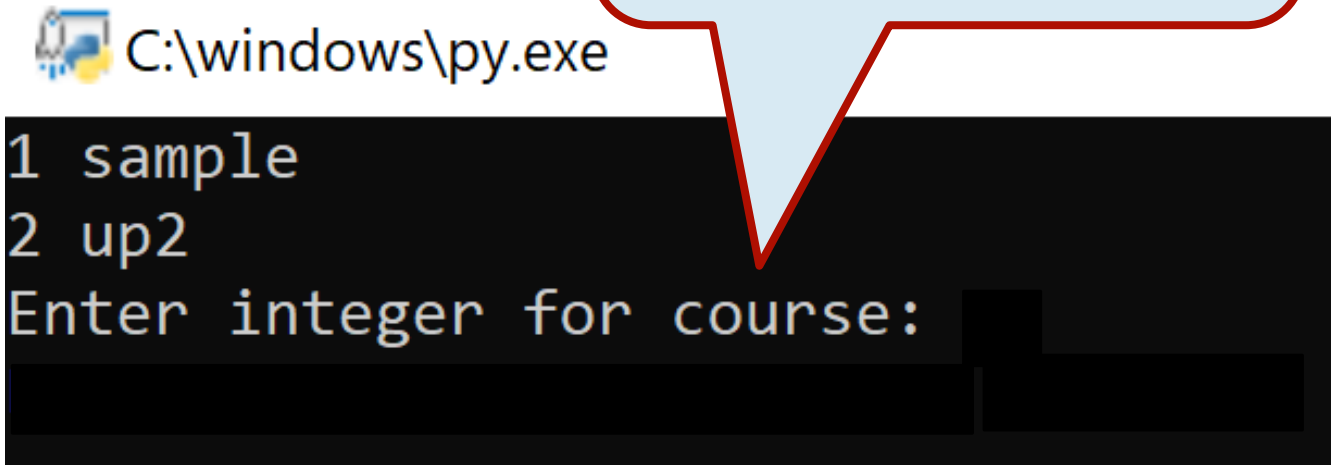


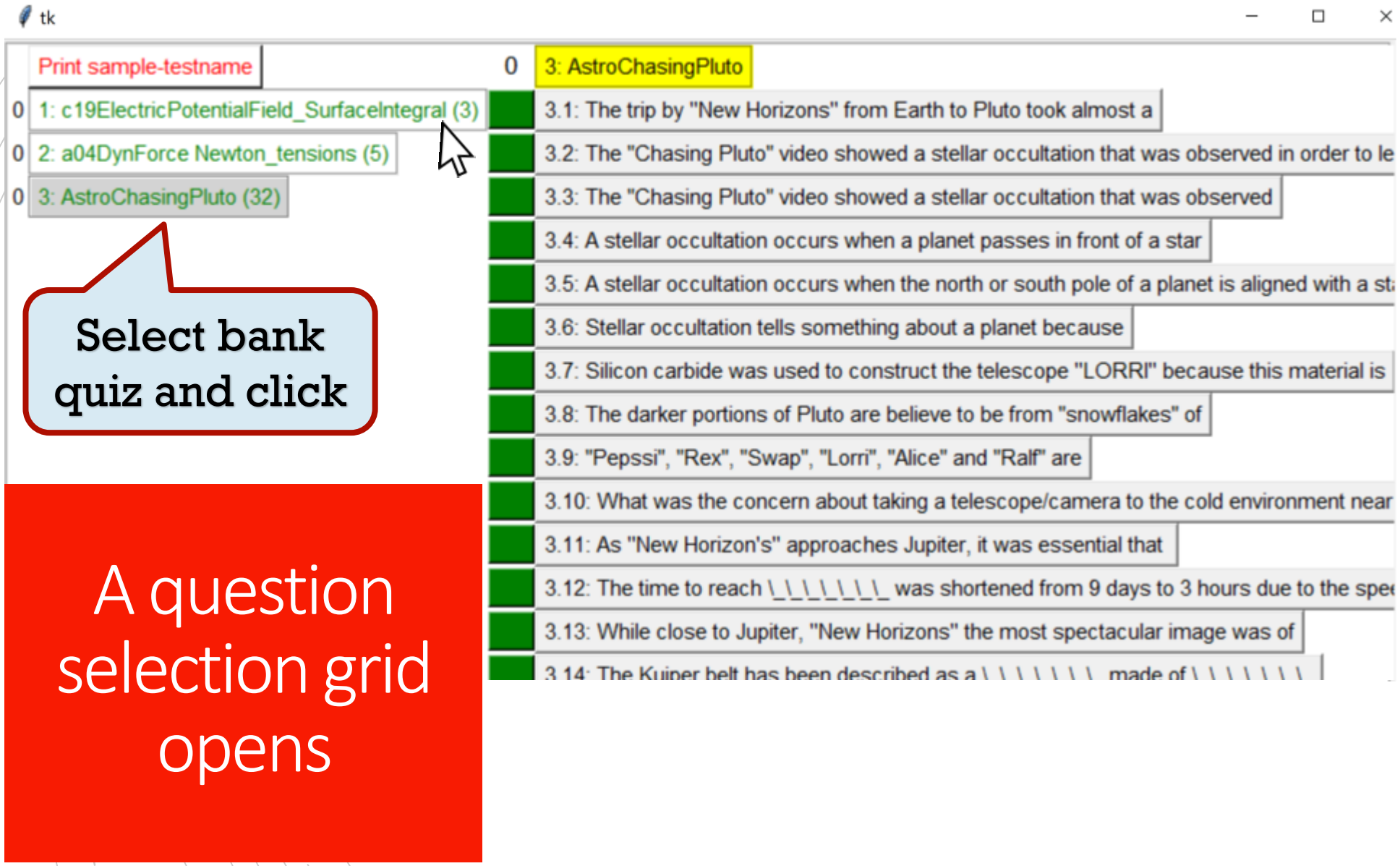
For more info Google:

Wikiversity quizbank

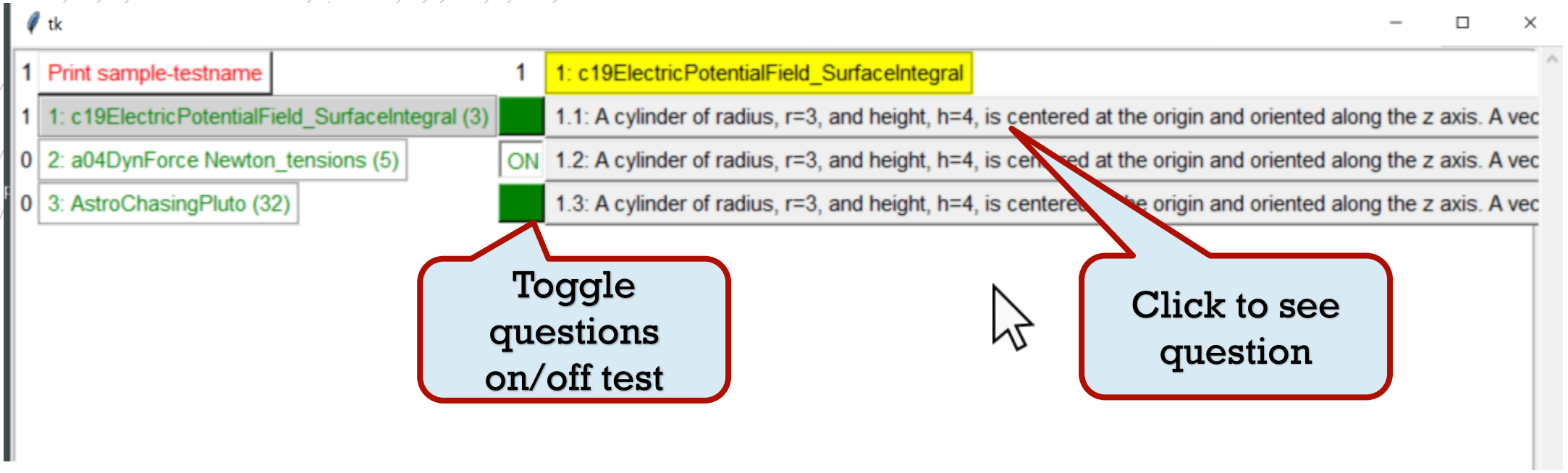
Command window

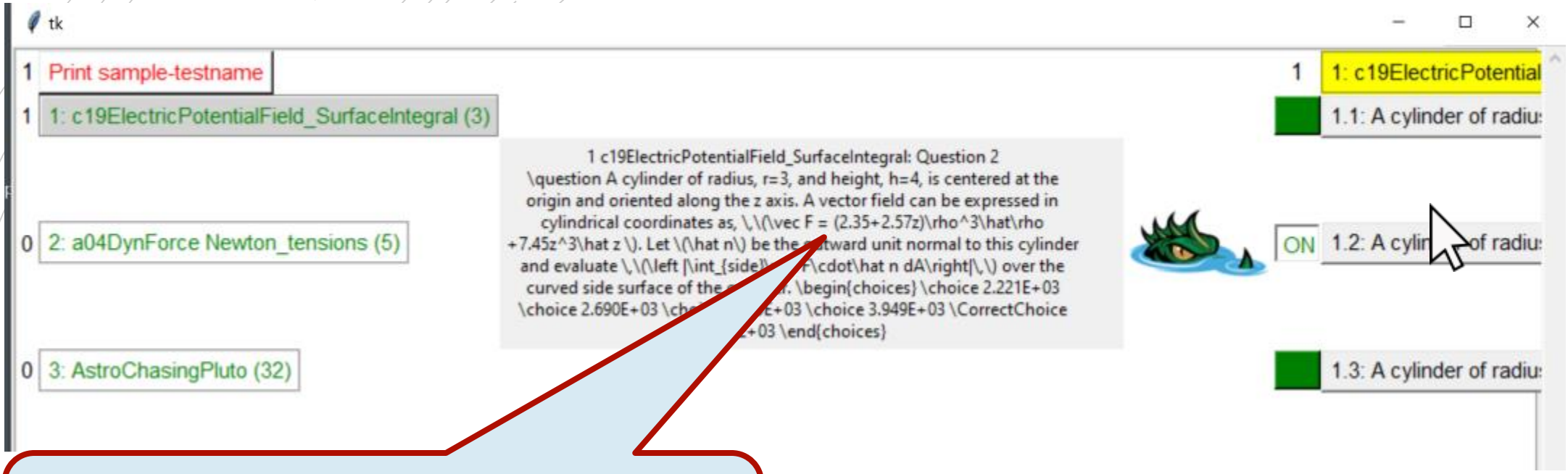
A "course" is just a list of bank quizzes (sample has only 3)





A question selection grid opens


tk
1 Print sample-testname
1 1: c19ElectricPotentialField_SurfaceIntegral
1 1: c19ElectricPotentialField_SurfaceIntegral (3)
1.1: A cylinder of radius, r=3, and height, h=4, is centered at the origin and oriented along the z axis. A vec
0 2: a04DynForce Newton_tensions (5)
ON
1.2: A cylinder of radius, r=3, and height, h=4, is cen ed at the origin and oriented along the z axis. A vec
0 3: AstroChasingPluto (32)
1.3: A cylinder of radius, r=3, and height, h=4, is centere e origin and oriented along the z axis. A vec
Toggle questions on/off test
Click to see question

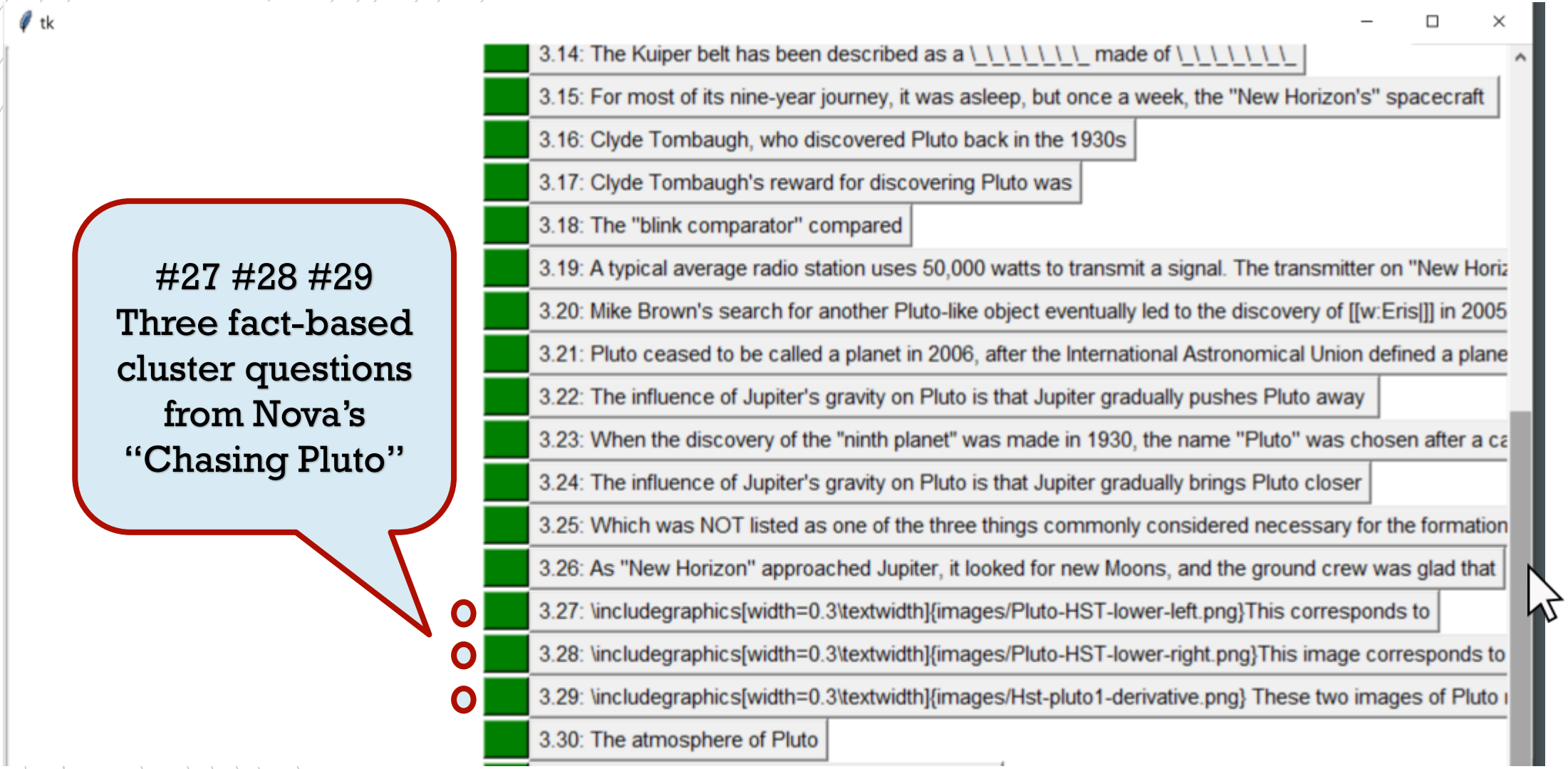


(2.35+2.57z)\rho^3\hat\rho translates to:

$$(2.35 + 2.57z)\rho^3\hat{\rho}$$

The code imbeds random variables into the LaTeX

#27 #28 #29
Three fact-based cluster questions from Nova's "Chasing Pluto"

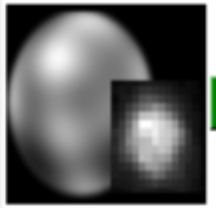


tk

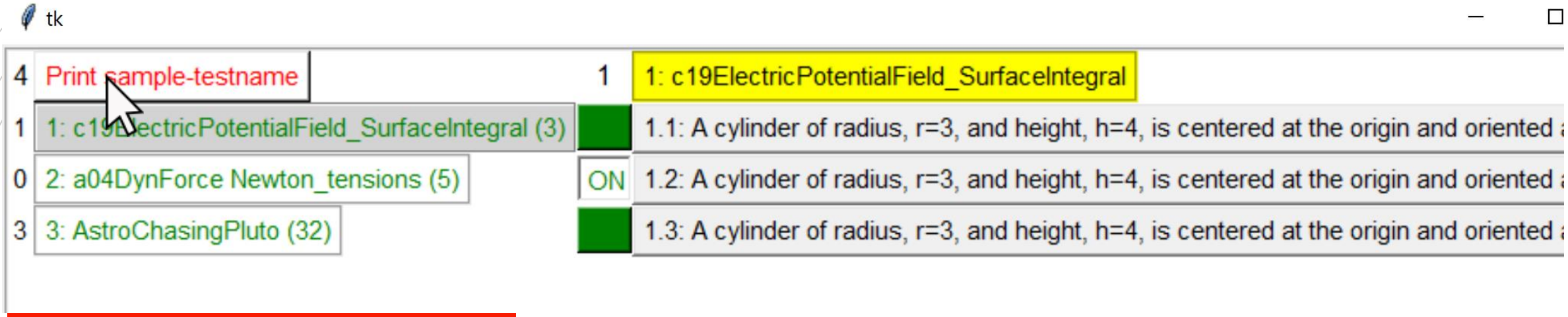
3.18: The "blink compa
3.19: A typical average
3.20: Mike Brown's sea
3.21: Pluto ceased to b
3.22: The influence of .
3.23: When the discov
3.24: The influence of .
3.25: Which was NOT
3.26: As "New Horizon
3.27: \includegraphics[
3.28: \includegraphics[

Question 29

3 AstroChasingPluto: Question 29
\question
\includegraphics[width=0.3\textwidth]{images/Hst-pluto1-derivative.png}
These two images of Pluto represent: \begin{choices} \choice a land-based telescope and the ''Hubble Space Telescope'' \CorrectChoice raw and processed images \choice ''New Horizon'' near Earth and mid-way to Pluto \choice ''New Horizon'' mid-way to Pluto and near Pluto \choice ''New Horizon'' and the ''Hubble Space Telescope'' \end{choices}



3.29: \includegraphics[
3.30: The atmosphere



Test *testname* in course *sample* has 4 questions

156565750323-sample-testname-...

File Edit Search Format Typeset Scripts Window Help

pdfLaTeX+MakeIndex+BibTeX

```
%PREAMBLE
\newcommand{\quiztype}{mixed}
\newif\ifkey\documentclass[11pt,twoside]{exam}
\RequirePackage{amssymb, amsfonts, amsmath, latexsym, verbatim,
xspace, setspace,datetime,tikz, pgflibraryplotmarks, hyperref,
textcomp}
\usepackage[left=.4in, right=.4in, bottom=.9in, top=.7in]{geometry}
\usepackage{endnotes, multicol,textgreek,graphicx} \singlespacing
\parindent 0ex \hypersetup{ colorlinks=true, urlcolor=blue}
\pagestyle{headandfoot}
\runningheader{testname: Test}{\thepage\ of \numpages}
{156565750323}
\footer{}
{\LARGE{The next page might contain more answer choices for this
question}}{}
% BEGIN DOCUMENT
\begin{document}\title{testname: Test}
\author{\includegraphics[width=0.10\textwidth]
{images/666px-Wikiversity-logo-en.png}\\
The LaTex code that creates this quiz is released to the Public Domain\
\
```

testname: Test

WIKIVERSITY

that creates this quiz is release
for each question is documente
bucket.org/Guy_vandegrift/
://en.wikiversity.org/wik
mixed quiz 15656575032

Monday 12th August,

ocument was created with
be possible for users to d
rsions of this document.

Timestamp on all pages

testname: Test

The LaTex code that creates this quiz is released to the Public Domain
Attribution for each question is documented in the Appendix
https://bitbucket.org/Guy_vandegrift/qbwiki/wiki/Home
https://en.wikiversity.org/wiki/Quizbank
mixed quiz 156565874890

Monday 12th August, 2019

Though posted on Wikiversity, this document was created without wikitex using Python to write LaTeX markup. With a bit more development it will be possible for users to download and use software that will permit them to create, modify, and print their own versions of this document.

Contents

0.1 V1 . . . 3
0.1.1 KEY V1 . . . 7
0.2 V2 . . . 11
0.2.1 KEY V2 . . . 15
1 Attribution 17

Multiple versions with keys

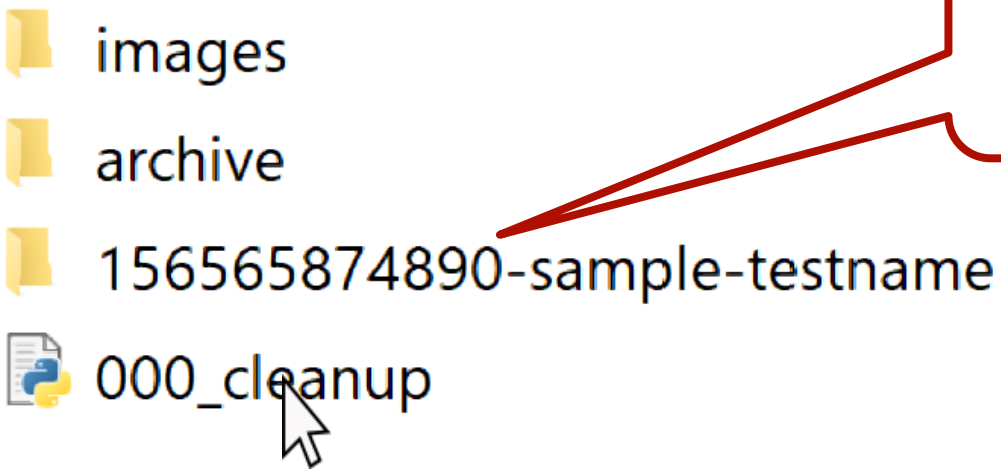
Attribution for each question

For more info Google:

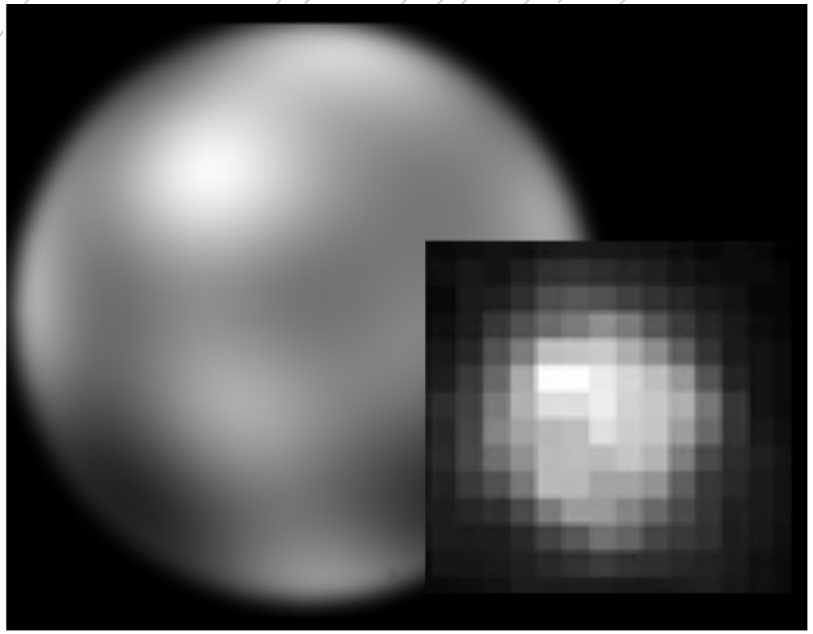
Wikiversity quizbank

Output file after running MiKTeX

Archive with 000_cleanup.py



All files with this timestamp moved here



This fact-based question is **useless** …
unless it immediately follows the learning experience

These two images of Pluto represent:[4]

3. A. a land-based telescope and the "Hubble Space Telescope"
   B. raw and processed images
   C. "New Horizon" near Earth and mid-way to Pluto
   D. "New Horizon" mid-way to Pluto and near Pluto
   E. "New Horizon" and the "Hubble Space Telescope"

That experience could a classroom video or short **passage on an exam**

	A	B	C	D	E	F	G
1	A mass of __m1 kg is attached to a mass of __m2 kg and experiences						
2	a force of __f N. What is the acceleration?						
3	m/s^2						
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14	1.15	1.8	2				
15	1.19	1.1	2				

Python converts to number strings: __m1, __m2, __f

l uses one or
e columns to
ulate a, e.g.:

2 / (B12+C12)

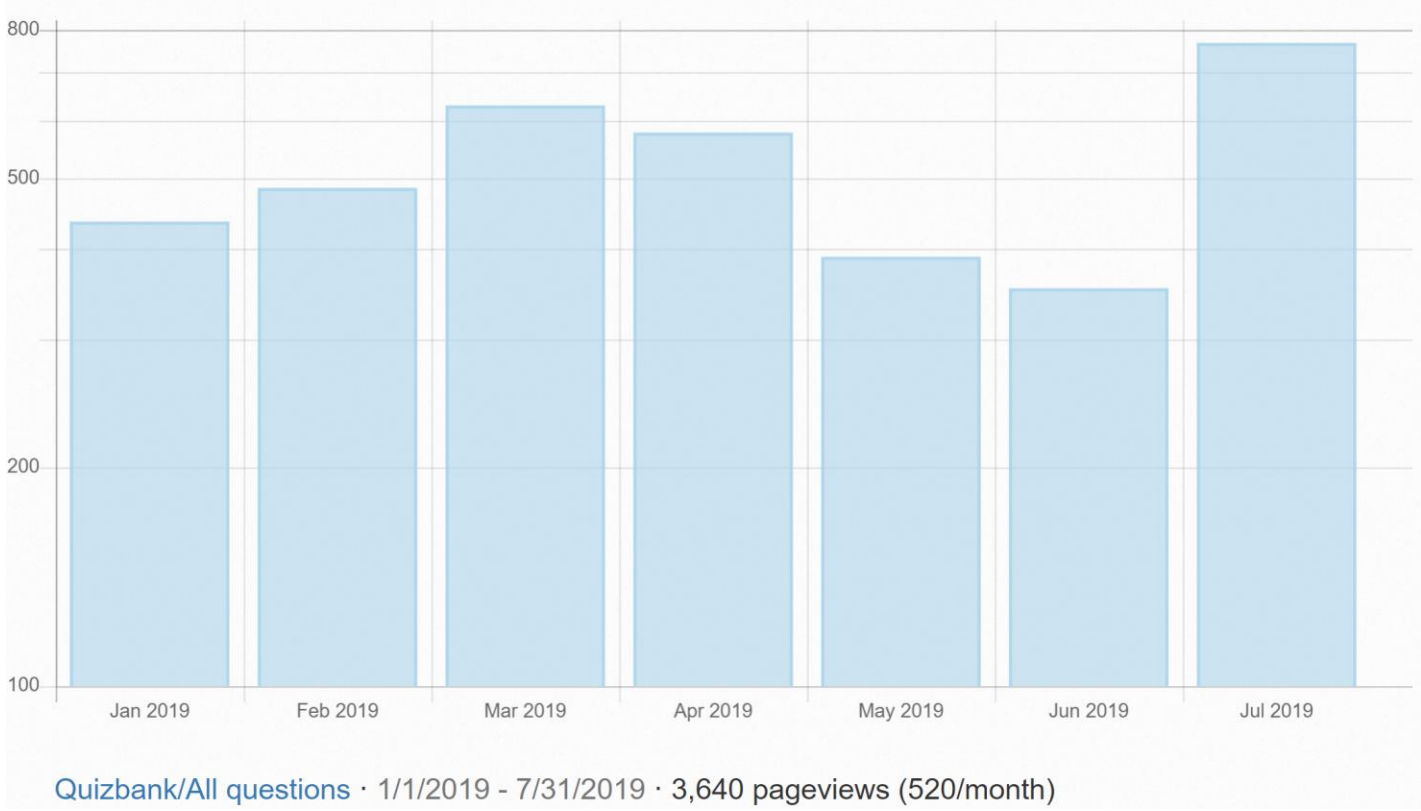
Students don't need to know Python/LaTeX to create exam questions. They can use:

Excel, MatLab, C, . . .

Random input:
=ROUND(1.01+0.9*RAND(),1)

https://tools.wmflabs.org/pageviews/?project=en.wikiversity.org&platform=all-access&agent=user&range=latest-20&pages=Quizbank/All_questions

The bank has been viewed 3,640 times in the last six months



Quizbank/All questions · 1/1/2019 - 7/31/2019 · 3,640 pageviews (520/month)

	A	B	C
1	3.20E+08	32 million:	US population
2	4.00E+06	divided by 80	freshman age
3	1.33E+06	divided by 3	in college
4	1.33E+04	divided by 100	1% professor participation
5	1.33E+04	13 thousand/year	at one question per student

Order-of-magnitude estimate

13 thousand bank questions per year!

In physics education, a ... **Fermi question** is an estimation problem designed to teach ... approximation.