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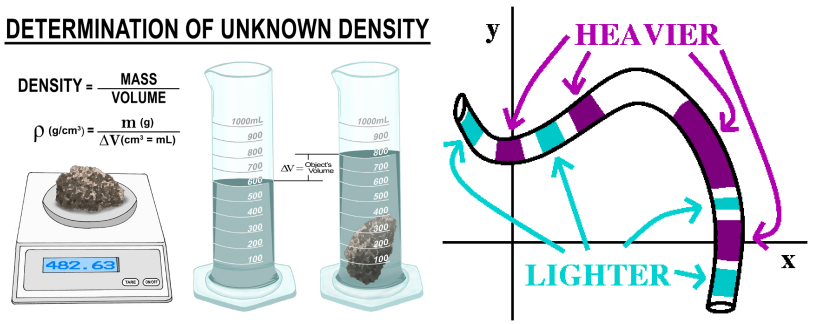
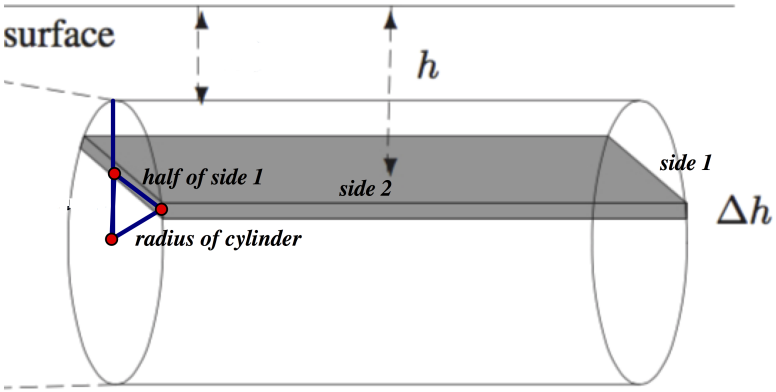
- Key: figure out slicing variable, then $\int \delta \cdot$ length or $\int \delta \cdot$area or $\int \delta \cdot$volume in that variable



Clicker Question



1. If $\delta = f(h)$ kg/m^3, where h is the distance of a slice of a cylindrical tank of radius 5m and length 21m buried 3 m below ground, then the total mass is:

a) $\int_3^{13} 2\pi h\delta(h)\,dh$

b) $\int_3^{13} \pi h^2\delta(h)\,dh$

c) $\int_3^{13} \delta(h)21 \times 2\sqrt{5^2-(8-h)^2} \times dh$

d) other

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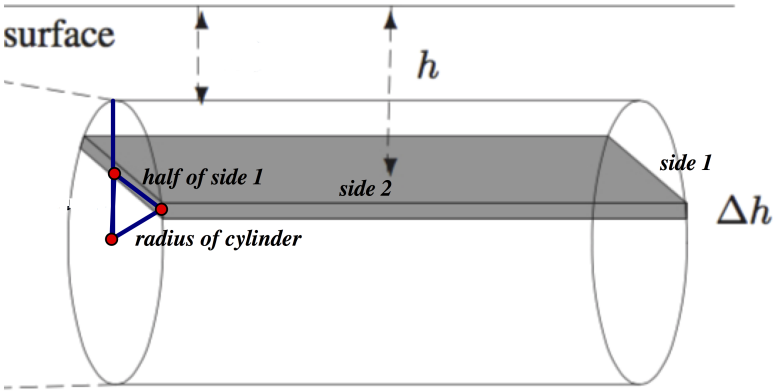

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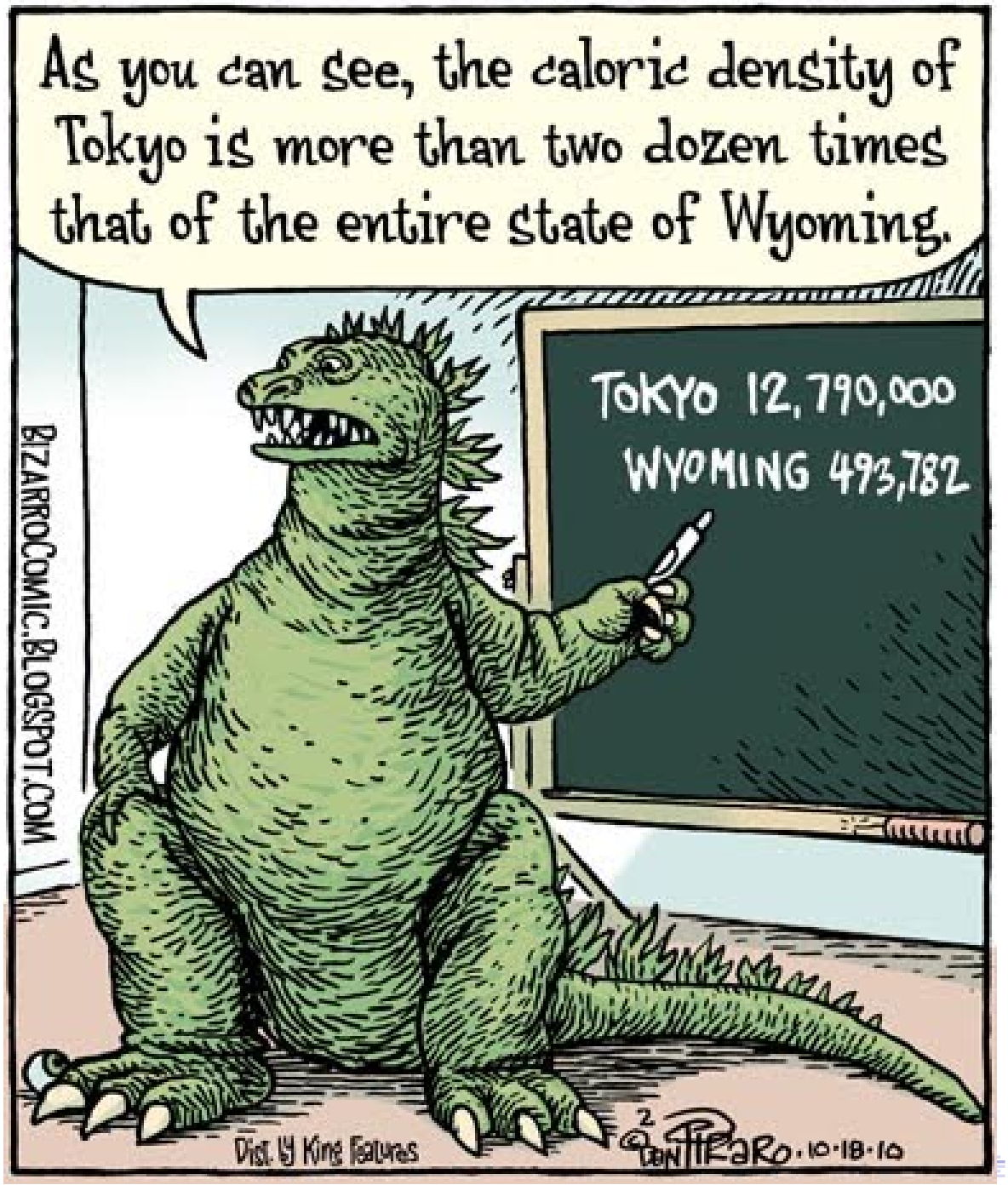
$\int_3^{13} \delta(h)$ volume of a slice $= \int_3^{13} \delta(h)21 \times 2\sqrt{5^2-(8-h)^2} \times dh$


As you can see, the caloric density of Tokyo is more than two dozen times that of the entire state of Wyoming.
TOKYO 12,790,000
WYOMING 493,782
BIZARROCOMIC.BLOGSPOT.COM
Dist. by King Features
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History and Applications

- Archimedes and King's gold
- 1798 Henry Cavendish density 'weighing the world'
- Sir Isaac Newton: aerodynamic drag is proportional to air density, cross sectional area and v^2
- protein in kidney
- population density to model infectious disease
- density of universe and geometry
- Probability Density Function (PDF)
- Cumulative Distribution Function (CDF)