AP Physics 2

9.2 Homework Hints

Problem 26

* This problem is like the lead MacGyver problem
* Remember what the volume of half a sphere would be
* If it’s just floating it’s in equilibrium – what does that mean?

Problem 27

* Buoyant force must equal the weight of the truck
* We know the change in volume, density of water. . .

Problem 28

* There is an equation in your book if you flip through that directly relates densities and volumes
* We also talked about this
* Make sure to answer the question (what fraction of the total volume is exposed)

Problem 33

* The balloon is in equilibrium – what forces are acting on it and in what direction?
* Look up density of air – that’s your fluid (it’s in the book)

Problem 34

* Again, the spring is in equilibrium – what are the forces acting on the wood block?
* You can calculate the buoyant force (how would I get the Volume of the wood?), weight and go from there
* It’s a spring so what’s the equation for force on a spring?

Problem 35

* We can find the density of air and the density of the alcohol
* In air we know the apparent weight (whoa, include buoyancy from the air and the actual weight of the object)
* Set up a similar equation for the alcohol
* Now you have two equations and two unknowns (density and volume)
* So you’ll solve for one and then sub in for the other

Problem 37

* Could you figure out the net force acting on the shell?
* Keep in mind the weight of the object, the weight of the fluid and the buoyant force from the pool (so we have buoyant forces and also the weight of the object)
* Net force is mass \* a
* So once you find the net force. . .

Problem 40

* How much fluid is leaving the hose every second (we know the velocity and could find area to give us volume flow rate)
* From there, we know the volume of the trough so we can figure out the time

Problem 43

* Keep in mind that pressure is F/A so you can find the pressure
* That stays the same (that’s a law!) throughout
* Now pressure is related to velocity (look it up or think of it as a way simplified Bernoulli)
* Find the velocity

Problem 45

* This is kind of reverse hotwheels – you could figure out the time in air and then the velocity leaving it
* If the tank is big enough (and that hole is really tiny) make some assumptions and it should be like an example we did in class

Problem 50

* Simplified Bernoulli – height is the same
* V inside
* What’s the pressure outside? (convert from atm)

Problem 51

* We did a similar proof with a giant leaking tank
* Set up Bernoulli and simplify  
  What’s open to air?

If you have questions or are stuck, post on our google + community page for help from classmates and me