QUIZ: FLUID PRESSURE

The data on the right were collected using the same method as you used in lab. Use these values to answer the following questions.

DEPTH (cm)	TOTAL PRESSURE (kPa)	WATER PRESSURE (kPa)	DEPTH (cm)	TOTAL PRESSURE (kPa)	WATER PRESSURE (kPa)
2.3	102.756	0.298	13.1	103.531	1.073
4.0	102.874	0.416	14.4	103.630	1.172
6.5	103.052		16.8	103.820	1.362
8.2	103.174	0.716	18.0	103.931	1.473
10.7	103.355	0.897	20.4	104.113	1.655
Atmospheric pressure = 102.458 kPa					

1. Calculate the water pressure at a depth of 6.5 cm below the surface:
   A) 0.294 kPa
   B) 0.394 kPa
   C) 0.494 kPa
   D) 0.594 kPa
   E) 0.694 kPa

2. True or false: When the depth is doubled from 10 cm to 20 cm, the total pressure also doubles.

3. True or false: When the depth is doubled from 10 cm to 20 cm, the water pressure also doubles.

4. Convert the atmospheric pressure of 102.458 kPa from kiloPascals into units of atmospheres.
   A) 0.989 atm
   B) 1.011 atm
   C) 9.889 atm
   D) 10.11 atm
   E) Trick question! 102.458 kPa = 102.458 atm

5. When the data of pressure as a function of depth are plotted, the graph
   A) is linear.
   B) is a parabola.
   C) is a sine wave.
   D) is an inverse-square curve.
   E) is random. There is no pattern to the data.

6. When these data are plotted, the slope of the best-fit line is *closest* to
   A) 0.076 kPa/cm.
   B) 0.132 kPa/cm
   C) 7.6 kPa/cm
   D) 13.2 kPa/cm.
   E) Trick question! The data are not linear, so there is no best-fit line!

7. When these data are plotted, the y-intercept is found to be 102.6 kPa. The intercept
   A) has no real physical meaning, it's just a number. Sometimes the math doesn't mean anything.
   B) tells you the depth below the water where the pressure is twice the pressure at the surface.
   C) is literally the pressure when the depth = zero, so it should match the atmospheric pressure.
   D) is the pressure when the depth = maximum, so it should be much higher than atmospheric pressure.
   E) is the depth below the surface where the water pressure (up) matches the atmospheric pressure (down); they cancel out, so an object at this depth feels weightless.

8. At a depth of 10 feet (305 cm) below the surface of the water, the pressure is *closest* to
   A) 105 kPa   B) 110 kPa   C) 115 kPa   D) 120 kPa   E) 125 kPa

9. How far below the surface would a scuba diver have to descend in order to experience twice surface (atmospheric) pressure? The *approximate* depth is
   A) 10 feet.   B) 20 feet.   C) 30 feet.   D) 40 feet.   E) 50 feet.

10. You are taking scuba lessons! As you prepare for your first open-water dive, your instructor reminds you that you must always hold your breath as you ascend to the surface.
    A) Are you sure this is a reputable scuba school? I think your diving instructor is trying to kill you.
    B) This is sound advice, and the first thing they teach you. Even *ScubaCat!* had to learn to hold her breath.

11. Your dive plan is to visit a shipwreck about 80 feet below the surface, and explore it for about an hour before surfacing. As a last reminder, your dive instructor tells you to ascend to the surface as fast as you can, without stopping (or exhaling--remember, you should be holding your breath).
    A) Seriously. He is trying to kill you. Whatever he says, do the opposite. For an hour spent at 80 feet, you need at least one 17 minute decompression break at 15 feet before surfacing.
    B) Again, this is sound advice from an experienced professional. The deeper you dive, the faster you should ascend. If you plan on making multiple dives in one day, you don't have time to waste on slow surfacing!