***MAP4C – Playdoh-Water-Paper (PWP) Questions***

1. You have a play doh cookie with a radius of 2 cm (diameter = 4 cm) and a height of 1 cm.  
   a) Calculate the volume of the playdoh cookie  
   b) Suppose you double the radius of the cookie, but keep the height the same. Calculate the volume of the new cookie.  
   c) How many times bigger is the volume of the big cookie?
2. You have a hunk of play doh in the shape of a sphere with radius = 3 cm.  
   a) Calculate the volume of the playdoh  
   b) Suppose you formed the playdoh into a cylinder with a radius of 3 cm. What would the height of the cylinder be?  
   c) You divide the playdoh into two equal pieces. What is the volume of each piece?  
   d) You form each piece into a cylinder with the same height as the cylinder in part b). What would the radius of that cylinder be?
3. A cylinder has a radius of 4 cm and a total height of 20 cm. There is water up to a height of 15 cm.   
   a) Calculate the volume of water in the cylinder  
   b) Calculate the volume of empty space (air) in the cylinder.   
   c) A golf ball has a radius of 2.2 cm. Calculate the volume of a golf ball  
   d) How many golf balls it will take to fill the amount of empty space in the cylinder (part b)?  
   d) Suppose Mr John did not drop spheres into the water, but rather identical cubes. If it took 10 of these cubes to make the water overflow, what was the side length of the cubes?
4. A certain piece of paper is big enough to build a cube that measures 8 cm in every direction (length, width, height).   
   a) Calculate the area of a piece of paper by calculating the surface area of the cube. Show your work.  
   b) Let’s say you build a cube using 2 pieces of paper (in other words, you are doubling the surface area). Determine the new side length of the cube. Show your work.  
   c) By what percent did the side length of the cube increase when you doubled the surface area?  
   d) Does this percent increase apply to other cubes that have their surface area doubled? Does it apply to ALL cubes? Show your work/thinking.

ANSWERS

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| 1a) 12.56 cm3 b) 50.26 cm3 c) 4x bigger |
| 2. a)V=113.1cm3 b) h=4cm c) V=56.6cm3 d) r=2.1 cm |
| 3. a) V=754 cm3 b) V=251.3 cm3 c) 44.6 cm3 d) 5.63 balls 🡪 6 e) side = 2.9 cm |
| 4. a) SA = 384 cm2 b) side = 11.3 cm c) 41% increase |