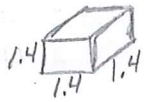
Name Key Date _____ Per. ____

Problem Solving with Surface Area & Volume

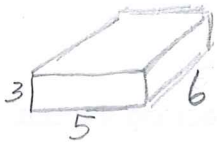
DIRECTIONS: Draw a diagram to solve each of the following problems. Use 3.14 for π. SHOW ALL WORK and formulas!! circle final answer!

1) A small gift box that holds a ring is shaped like a cube. The box measures 1.4 inches on each side. What is the volume of the gift box? Round your answer to the nearest tenth.



$Vol = Bh$
$= (1.4)(1.4)(1.4)$
$= 2.74$
$Vol = 2.7\ in^3$

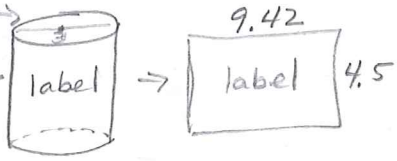
2) The average stone on the lowest level of the Great Pyramid in Egypt was a rectangular prism 5 feet long by 3 feet high by 6 feet deep and weighed 15 tons. What was the volume of the average casing stone?



$Vol = Bh$
$= (5.6)(3)$
$= 30.3$
$Vol = 90\ ft^3$

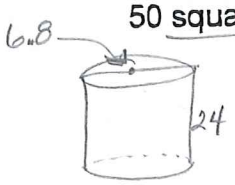
3) A can of peas is 3 inches in diameter and 4.5 inches tall. What is the area of the label used around the can?

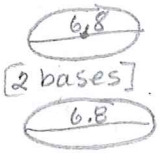
$C = \pi d$
$= 3.14(3)$
$C = 9.42$



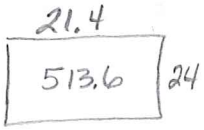
$A = bh$
$= 9.42 \cdot 4.5$
$= 42.39\ in^2$

4) A cylinder shaped sculpture is 24 meters high with a diameter of 6.8 meters. An artist plans to spray-paint the entire surface with silver paint. If one can of spray paint covers 50 square meters, how many cans does the artist need to paint the sculpture?





$A = \pi r^2$
$= 3.14 \cdot (3.4)^2$
$= 3.14 \cdot (11.56)$

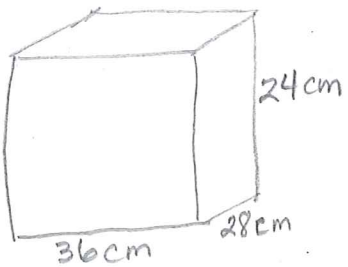


$C = \pi d$
$= 3.14 \cdot (6.8)$
$= 21.352$
$C = 21.4$

$A = 36.3 \times 2\ bases = 72.6\ m^2$

total SA
513.6
72.6
$586.2\ m^2$
$\div 50$
11.7 so
12 cans

5) A cubic centimeter holds 1 milliliter of liquid. How many liters of water to the nearest tenth are required to fill a fish tank that is 24 centimeters high, 28 centimeters long, and 36 centimeters wide?

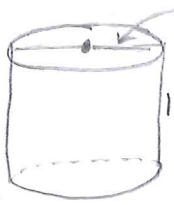


$Vol = Bh$
$= (36 \cdot 28) \cdot 24$
$= 1008 \cdot 24$
$Vol = 24{,}192\ cm^3$

$1{,}000\ ml = 1\ liter$

$\frac{24{,}192}{1000} = 24.192 = 24.2\ liters$

6) There are 231 cubic inches in a gallon. A large juice can has a diameter of 6 inches and a height of 10 inches. How many gallons of juice does the can hold? Round your answer to the nearest tenth.



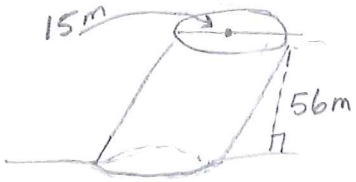
$Vol = Bh$
$= 28.26 \cdot 10$
$Vol = 282.6\ in^3$

$A = \pi r^2$
$= 3.14 \cdot 3^2$
$= 3.14 \cdot 9$
$A = 28.26\ in^2$

$\frac{282.6}{231} = 1.2\ gal$

7) The Leaning Tower of Pisa in Italy appears to be cylindrical in shape. Its height is about 56 meters. If the volume of the tower is about 9,981 cubic meters, what is the diameter of the base, rounded to the nearest tenth?

B = area of the base

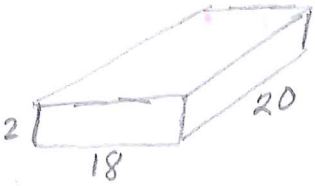


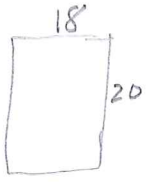
$Vol = Bh$
$\frac{9981}{56} = \frac{B \cdot 56}{56}$
$178.2 = B$
$\frac{178.2}{\pi} = \frac{\pi \cdot r^2}{\pi}$
$56.75 = r^2$

$\sqrt{56.75} = \sqrt{r^2}$
$7.5 = r$
$15 = d$

8) How much wrapping paper do you need to completely cover a rectangular box that is 20 inches long, 18 inches wide and 2 inches high?

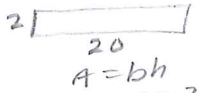
SA = adding up all areas of sides





$A = bh$
$= 360$
$\times 2$
$720\ in^2$

$A = bh$
$= 18 \cdot 2$
$= 36$
$\times 2$
$72\ in^2$

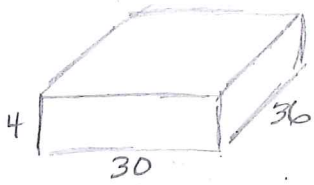


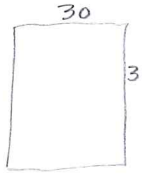
$A = bh$
$= 20 \cdot 2$
$= 40$
$\times 2$
$80\ in^2$

Total SA
720
72
+ 80
$872\ in^2$

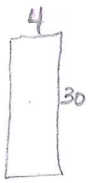
9) A rectangular sofa cushion is 36 inches by 30 inches by 4 inches. How many cushions can be covered with 15,000 square inches of fabric?

Find total SA

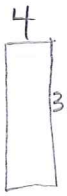




$A = bh$
$= 30 \cdot 36$
$= 1080$
$\times 2$
$2160\ in^2$



$A = bh$
$= 30 \cdot 4$
$= 120$
$\times 2$
$240\ in^2$



$A = bh$
$= 36 \cdot 4$
$= 144$
$\times 2$
$288\ in^2$

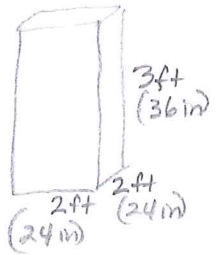
Total SA
2160
240
+ 288
$2688\ in^2$

$\frac{15000}{2688} = 5.6$

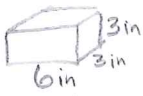
5 total cushions

10) A brick layer is building a brick rectangular post to anchor a mailbox. The post is 3 feet tall, 2 feet deep, and 2 feet wide. Each brick is 3 inches by 6 inches by 3 inches. How many bricks does he need?

POST



$Vol = Bh$
$= (24 \cdot 24) \cdot 36$
$= 576 \cdot 36$
$Vol = 20736\ in^3$



BRICK

$Vol = Bh$
$= (6 \cdot 3)(3)$
$= 18 \cdot 3$
$Vol = 54\ in^3$

$\frac{20736}{54} = 384$ bricks