

First name: \_\_\_\_\_ Last name: \_\_\_\_\_ Student ID: \_\_\_\_\_

### 3D Geometry Homework

#### Basic problems

1. Determine the length of the space diagonal of each rectangular prism/cube with the given dimensions (the shortest distance between two opposite corners through the interior of the prism) in exact value. Show work!

1.  $10\text{cm} \times 10\text{cm} \times 10\text{cm}$

2.  $2\text{cm} \times 3\text{cm} \times 5\text{cm}$

3.  $3\text{cm} \times 6\text{cm} \times 9\text{cm}$

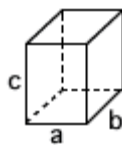
2. Find the volume of each solid in exact value. Show work!

1.



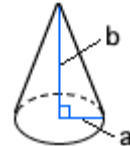
$a = 9\text{ cm}$   
 $b = 18\text{ cm}$

2.



$a = 3\text{ km}$   
 $b = 8\text{ km}$   
 $c = 23\text{ km}$

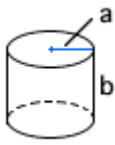
3.



$a = 6\text{ in}$   
 $b = 8\text{ in}$

3. Find the surface area of each solid in exact value. Show work!

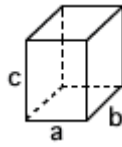
1.



$$a = 9 \text{ cm}$$

$$b = 18 \text{ cm}$$

2.

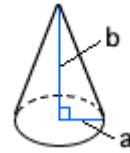


$$a = 3 \text{ km}$$

$$b = 8 \text{ km}$$

$$c = 23 \text{ km}$$

3.

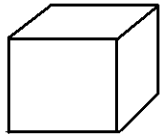


$$a = 6 \text{ in}$$

$$b = 8 \text{ in}$$

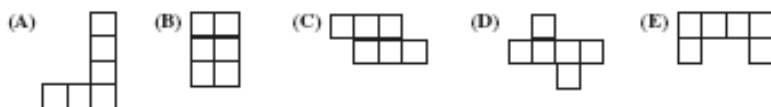
### Challenge Problems

1. Jamie counted the number of edges of a cube, Jimmy counted the number of corners, and Judy counted the number of faces. They then added the three numbers. What was the resulting sum?

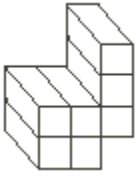


2. A cube has a surface area of  $24\text{cm}^2$ . What is the volume of the cube?

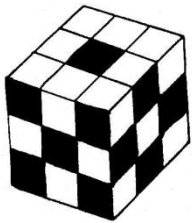
3. Which of the following can be folded along the lines to form a cube?



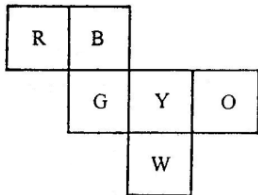
4. In the diagram, the object is made up of seven  $1 \times 1 \times 2$  solids. What is the total surface area of the object?



5. The large cube shown is made up of 27 identical sized smaller cubes. For each face of the large cube, the opposite face is Shaded the same way. What is the total number of smaller cubes that must have at least one face shaded?

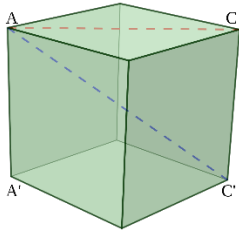


6. Six squares are colored, front and back, (R = red, B = blue, O = orange, Y= yellow, G = green, and W = white). They are hinged together as shown, then folded to form a cube. What is the face opposite the white face?



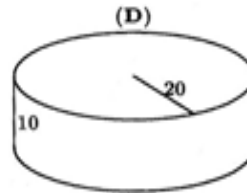
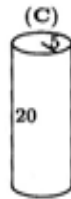
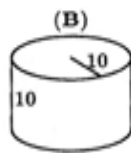
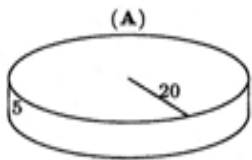
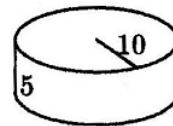
7. For his birthday, Bert received a box filled to capacity with 66 chocolate truffles. A few weeks later, Carrie got a *slightly* different box full of the same kinds of chocolate truffles for her birthday. Her box was 10% taller, 20% narrower, and 10% longer than Bert's box. Approximately, how many chocolate truffles did Carrie get?

8. A cube has eight *vertices* (corners) and twelve *edges*. A line segment, such as  $AC$ , which joins two opposite vertices on a *face* is called a *face diagonal*. A line segment, such as  $AC'$ , which joins two opposite vertices that are not on the same face is called a *space diagonal*. How many diagonals does a cube have?

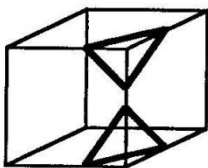


9. Which cylinder has twice the volume of the cylinder shown to the right?

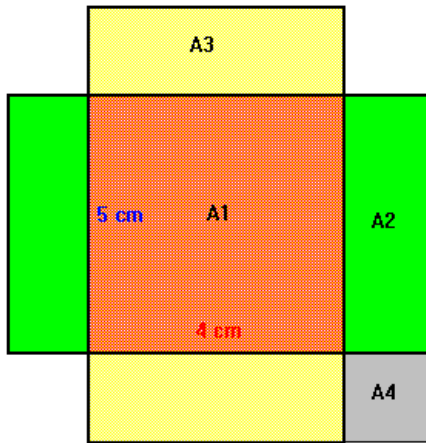
Note: diagrams are not drawn to scale.



10. Each corner of a rectangular prism is cut off. Two (of the eight) cuts are shown. How many edges does the new figure have?



11. A rectangular sheet of wood has four small squares removed. It is then cut to make a box that is 5cm by 4cm with a volume of  $60\text{cm}^3$ . (Four pieces of size A4 are removed.) Find the original area of the sheet of wood.



12. Given a rectangular prism, if the sides of the rectangle A have the same ratio to each other as the sides of rectangle B, then what is

- the surface area of the prism?
- the volume of the prism?

