

Name \_\_\_\_\_ Per \_\_\_\_\_

LO: I can describe and use Cavalieri's Principle.

**DO NOW** On the back of this packet

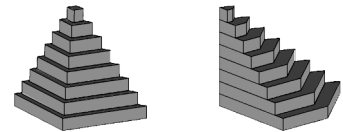
(6) **Cavalieri's Principle**  
internet

**Cavalieri's Principle** -- Given two solids that are included between two parallel planes, if every plane parallel to the two planes intersects both solids in cross-sections of equal area, then the volumes of the two solids are equal.

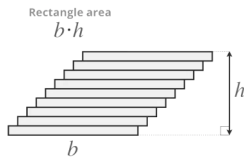
Go to the websites below which demonstrate Cavalieri's Principle in 2D and 3D. Answer the questions for each part of the demonstration.

2D: <https://schoolyourself.org/learn/geometry/cavalieri-2d>

3D: <https://schoolyourself.org/learn/geometry/cavalieri-3d>



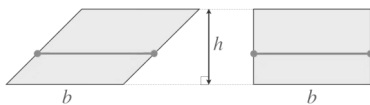
**2D**



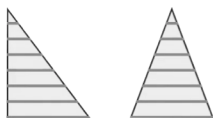
(1) The area of a rectangle is found by \_\_\_\_\_

(2) The diagram at left shows that by slicing a rectangle and shifting each slice we get a shape that resembles a \_\_\_\_\_

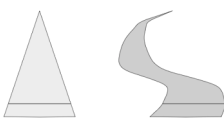
(3) The area of a parallelogram is found by \_\_\_\_\_



(4) Cavalieri's Principle for area states that \_\_\_\_\_



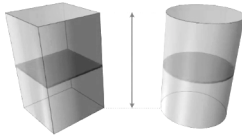
(5) The areas for the triangles at right are \_\_\_\_\_ because \_\_\_\_\_



(6) The areas for the shapes at left are \_\_\_\_\_ area as long as \_\_\_\_\_

(3) Cavalieri's Principle 3D  
 cont.  
 calculator

3D: <https://schoolyourself.org/learn/geometry/cavalieri-3d>



3D

(7) Cavalieri's Principle for volume states that \_\_\_\_\_

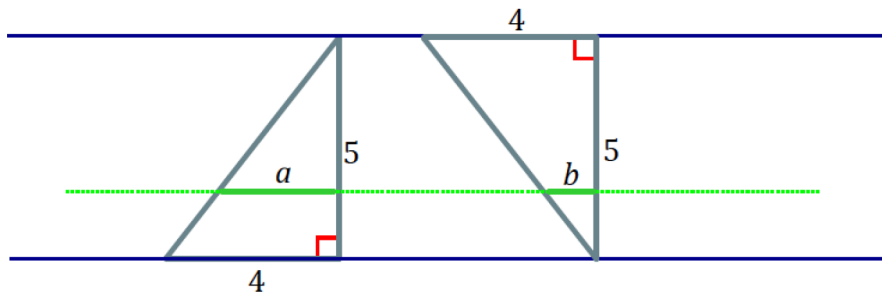
\_\_\_\_\_



(8) The volumes for the shapes at left are \_\_\_\_\_ because \_\_\_\_

(4) Cavalieri's 2D

Joey says that if two figures have the same height and the same area, then their cross-sectional lengths at each height will be the same. Give an example to show that Joey's theory is incorrect.



(5) Cavalieri's  
calculator

- Use the principle of parallel slices to explain the area formula for a parallelogram.

- Use the principle of parallel slices to show that the three triangles shown below all have the same area.

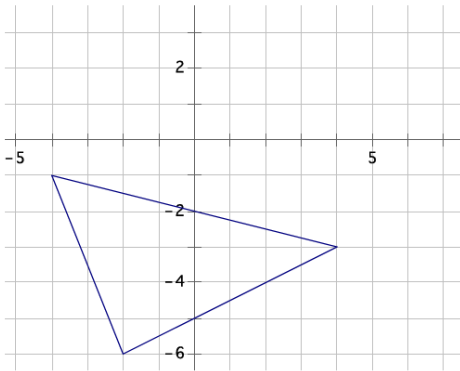


Figure 1

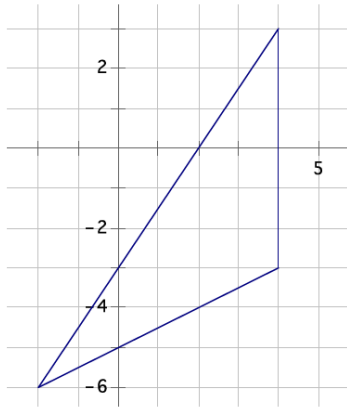


Figure 2

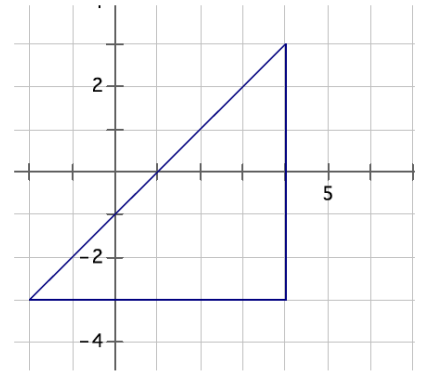


Figure 3

(8) **Exit Ticket**

calculator

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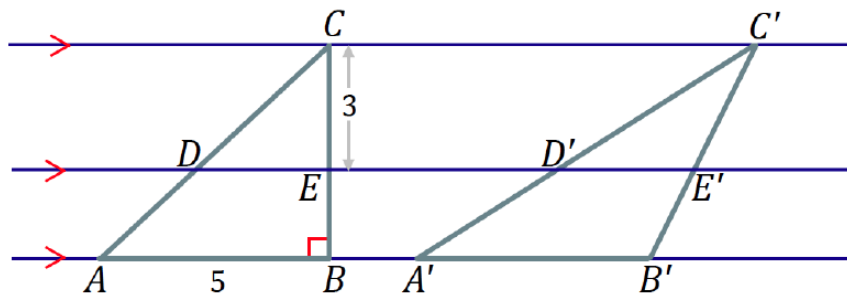
 (9) **Homework**

calculator

Provide sufficient evidence for each response.

 (1)

The following triangles have equal areas:  $\text{Area}(\triangle ABC) = \text{Area}(\triangle A'B'C') = 15 \text{ units}^2$ . The distance between  $\overline{DE}$  and  $\overline{CC'}$  is 3. Find the lengths  $\overline{DE}$  and  $\overline{D'E'}$ .

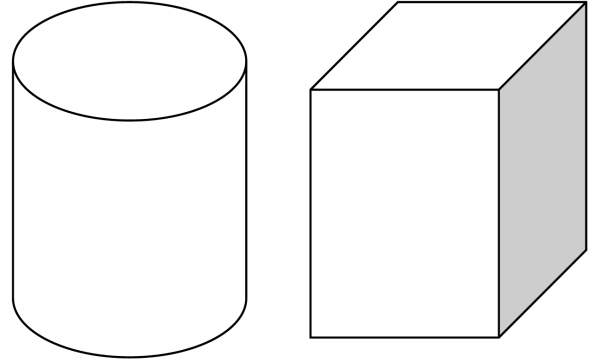

 (2)

Joey says that if two figures have the same height and the same area, then their cross-sectional lengths at each height will be the same. Give an example to show that Joey's theory is incorrect.

(9) Cavalieri's Principle  
internet

(3)

Morgan tells you that Cavalieri's principle cannot apply to the cylinders shown below because their bases are different. Do you agree or disagree? Explain.



(4) Use the principle of parallel slices to show that the two triangles below both have the same area.

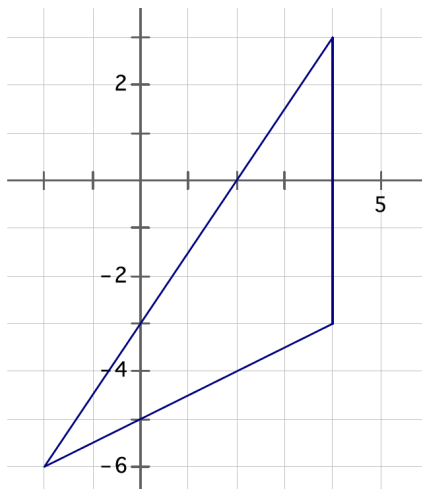


Figure 2

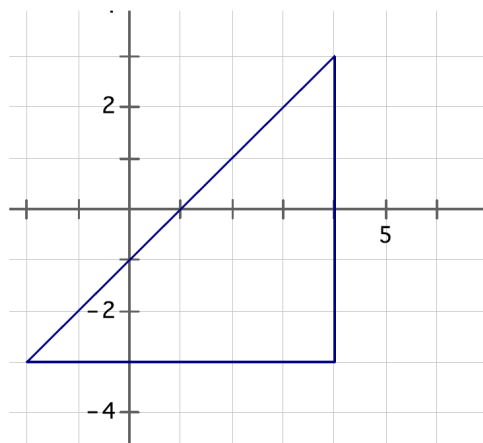
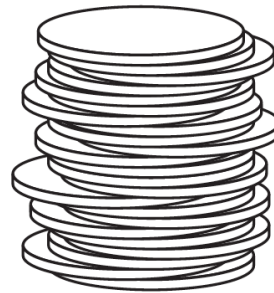
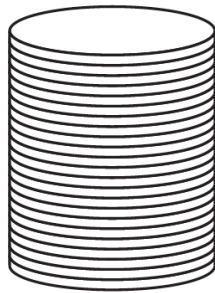


Figure 3

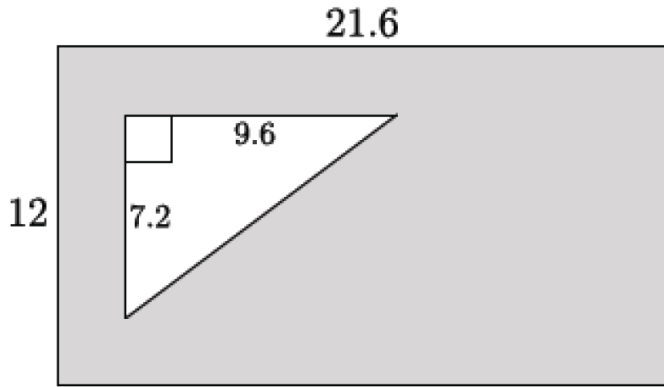


The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

(1) Two stacks of 23 quarters each are shown below. One stack forms a cylinder but the other stack does not form a cylinder. Use Cavalieri's principle to explain why the volumes of these two stacks of quarters are equal.



(1) Find the area of the shaded region. Explain how you determined the area.



(2) In this case, permuting mans switching the places of the triangles. How does an egg disappear?

