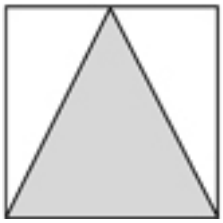
NAEP Released Items Aligned to the Iowa Core

6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

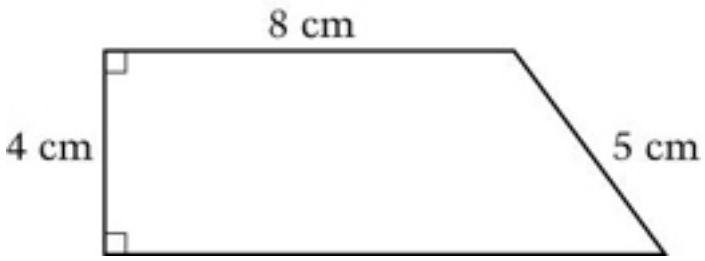


If the area of the shaded triangle is 4 square inches, what is the area of the entire square?

A. 2 square inches
B. 4 square inches
C. 8 square inches
D. 16 square inches

2007-4-9-19
1992-8-15-11

Source: National Assessment of Educational Progress, 2007, Grade 4 Mathematics Assessment and 1992, Grade 8 Mathematics Assessment.

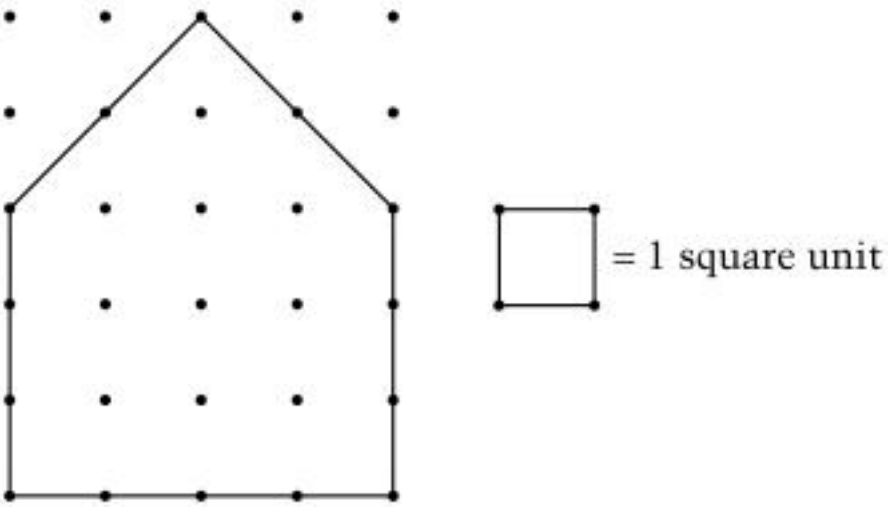


What is the area of the figure shown above?

A. 28 square centimeters
B. 32 square centimeters
C. 38 square centimeters
D. 44 square centimeters
E. 64 square centimeters

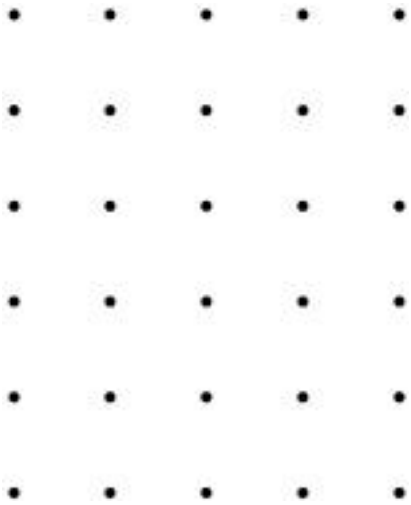
2009-8-10-6

Source: National Assessment of Educational Progress, 2009, Grade 8 Mathematics Assessment.



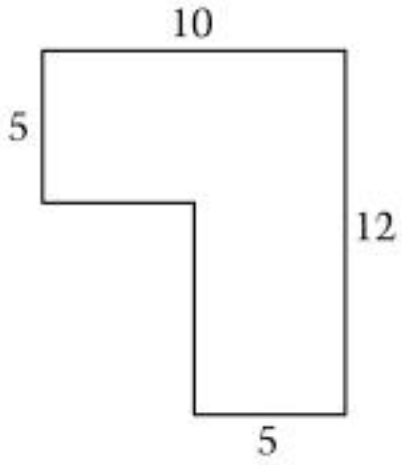
What is the area, in square units, enclosed by the pentagon above?

On the figure below, draw a different pentagon that has the same area as the one shown. (Be sure the pentagon that you draw does not look like the one shown when it is turned in a different direction.)

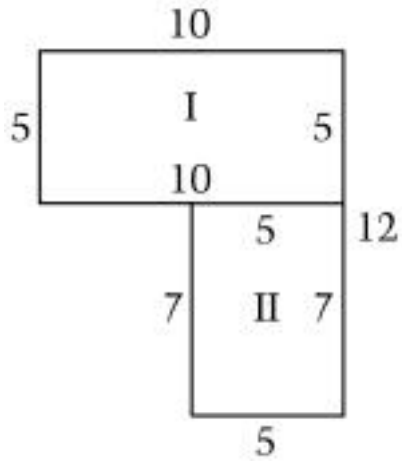


2005-8-4-17

Source: National Assessment of Educational Progress, 2005, Grade 8 Mathematics Assessment.

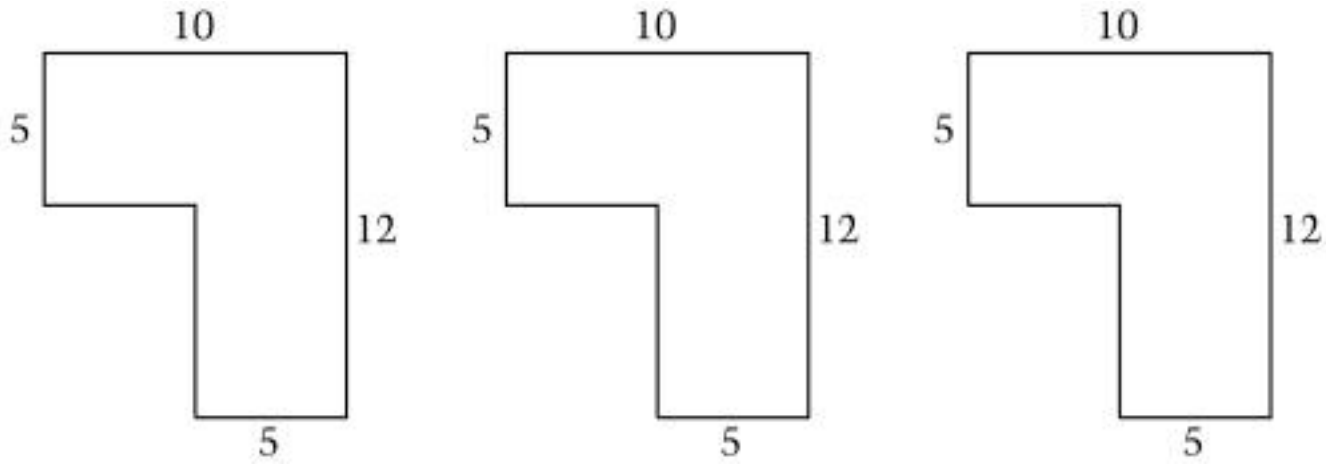


Ted wants to purchase floor covering for the hallway shown above. He knows there are many ways to find the area of the hallway. One way is to divide the hallway into the sections shown below and then add together the area of each section.



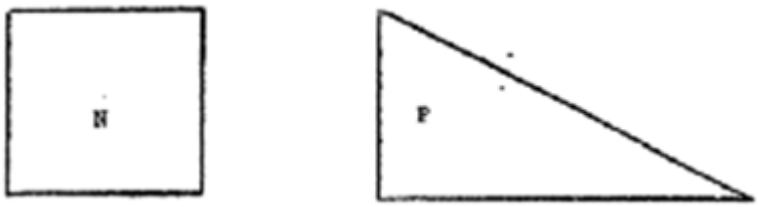
Area of Hallway = Area of Region I + Area of Region II
Area = (5 x 10) + (7 x 5)

Use the figures below to show 3 other ways that Ted can divide the hallway to find its area. Below each figure explain what numbers and operations Ted could use to calculate the area.



2003-8-6-29

Source: National Assessment of Educational Progress, 2003, Grade 8 Mathematics Assessment.



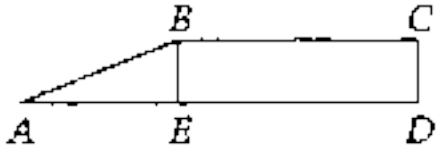
Bob, Carmen, and Tyler were comparing the areas of *N* and *P*. Bob said that *N* and *P* have the same area. Carmen said that the area of *N* is larger. Tyler said that the area of *P* is larger.

Who was correct?_____

Use words or pictures (or both) to explain why.

1996-8-10-5

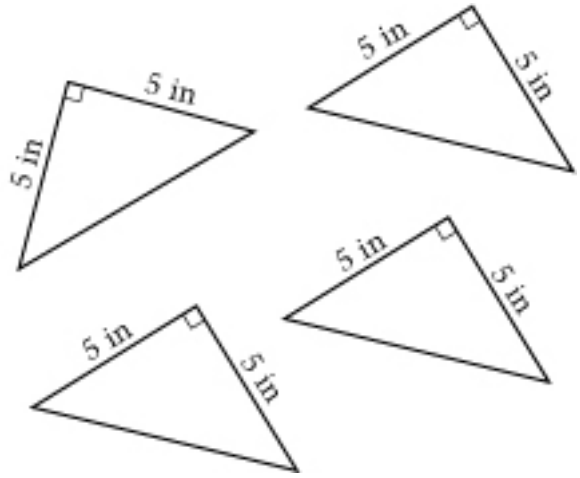
Source: National Assessment of Educational Progress, 1996, Grade 8 Mathematics Assessment.



The area of rectangle *BCDE* shown above is 60 square inches. If the length of *AE* is 10 inches and the length of *ED* is 15 inches, what is the area of trapezoid *ABCD*, in square inches?

1992-8-12-6
1992-12-12-6

Source: National Assessment of Educational Progress, 1992, Grade 8 and Grade 12 Mathematics Assessments.



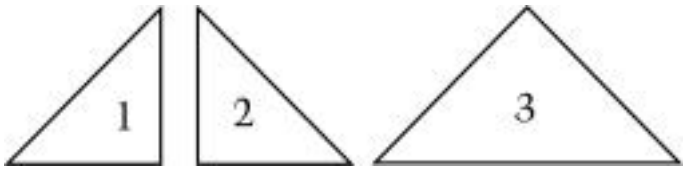
Make a drawing in the space below to show how the four triangles shown above could fit together without overlapping to make a rectangle that is not a square. Show the dimensions of the rectangle on your drawing. What is the area of this rectangle?

2007-8-7-11

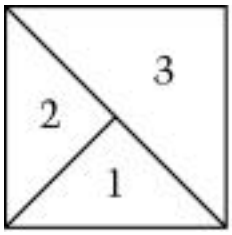
Source: National Assessment of Educational Progress, 2007, Grade 8 Mathematics Assessment.

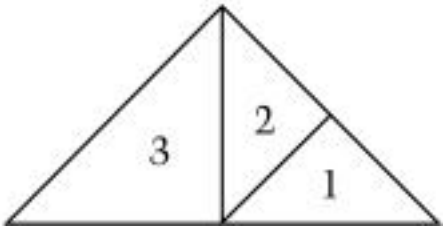
_____

The following question refers to the following information.



Triangles 1, 2, and 3 shown above can be rearranged with no overlap to form either of the following figures.



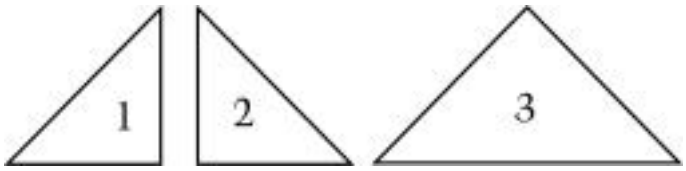


Draw lines on the figure below to show how triangles 1, 2, and 3 can be rearranged without overlap to form this parallelogram.

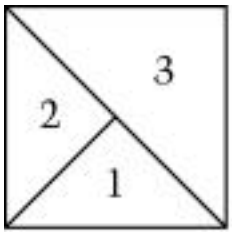
2003-8-10-6

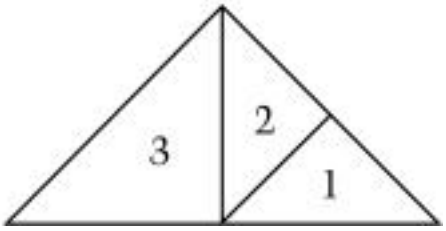
Source: National Assessment of Educational Progress, 2003, Grade 8 Mathematics Assessment.

The following question refers to the following information.



Triangles 1, 2, and 3 shown above can be rearranged with no overlap to form either of the following figures.

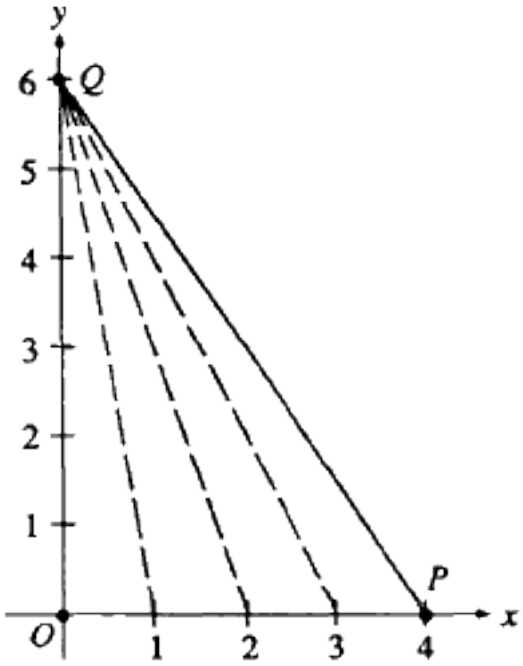




Draw lines on the figure below to show how triangles 1, 2, and 3 can be rearranged without overlap to form this rectangle.

2003-8-10-7

Source: National Assessment of Educational Progress, 2003, Grade 8 Mathematics Assessment.



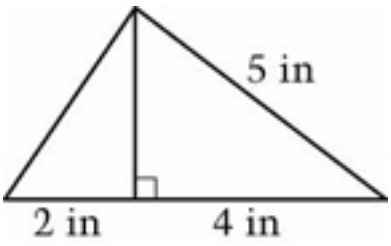
In the figure above, point *Q* is fixed and point *P* starts at 4 and moves left along the x-axis. As *P* moves left along the x-axis toward *O*, the area of $\triangle POQ$ changes.

Use the information given to complete the table below to show how the area of $\triangle POQ$ changes as *P* goes from the position shown to the origin *O*.

x-coordinate of *P*	Area of $\triangle POQ$
4	
3	
2	
1	
0	

1992-12-5-11

Source: National Assessment of Educational Progress, 1992, Grade 12 Mathematics Assessment.



What is the area of the figure above?

ANSWER: _____ square in.

2008-17-21-10

Source: National Assessment of Educational Progress, 2008, Age 17 Mathematics Assessment.

What is the greatest number of squares with 9-inch sides that can be cut from a rectangular piece of cloth 18 inches by 36 inches?

1990-12-7-20

Source: National Assessment of Educational Progress, 1990, Grade 12 Mathematics Assessment.

6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

In order to prepare a piece of ground for building a brick patio, a rectangle measuring 8 feet by 10 feet must be marked off. Then the dirt within the rectangle must be dug out to a depth of 6 inches. Finally, the resulting space must be filled with sand.

(a) What is the volume of sand needed, in cubic feet, to fill the space?

_____ cubic feet

Show your work. If you used your calculator, show the numbers and operations that you used to get your answer.

(b) Sand costs $4 per cubic foot. What is the total cost of the sand needed to fill this space, including a $35 delivery charge?

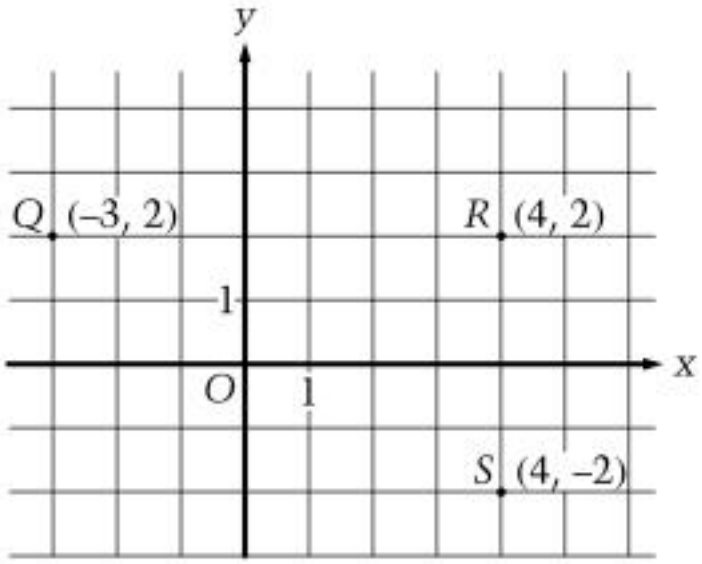
$_____

Show your work. If you used your calculator, show the numbers and operations that you used to get your answer.

2011-8-9-15

Source: National Assessment of Educational Progress, 2011, Grade 8 Mathematics Assessment.

6.G.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

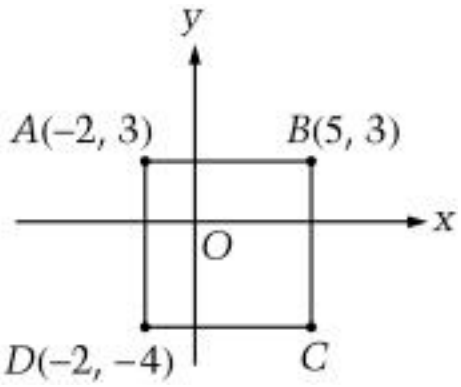


If the points *Q*, *R*, and *S* shown above are three of the vertices of rectangle *QRST*, which of the following are the coordinates of *T* (not shown)?

A. (4, -3)
B. (3, -2)
C. (-3, 4)
D. (-3, -2)
E. (-2, -3)

2005-8-3-13

Source: National Assessment of Educational Progress, 2005, Grade 8 Mathematics Assessment.



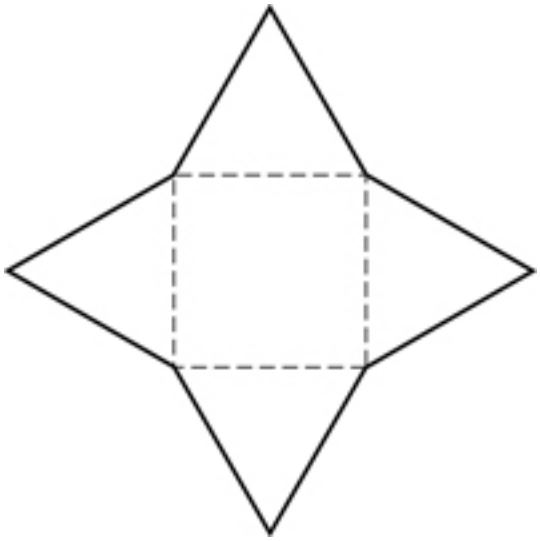
In the figure above, if *ABCD* is a square, then the coordinates of vertex *C* are

A. (4,5)
B. (3,-4)
C. (3,-2)
D. (5,-4)
E. (5,-2)

2003-8-6-26

Source: National Assessment of Educational Progress, 2003, Grade 8 Mathematics Assessment.

6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.



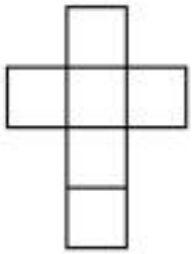
What three-dimensional shape could be made by folding the figure above on the dotted lines until the points on the triangles meet?

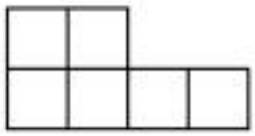
A. Triangle
B. Pyramid
C. Cube
D. Cone

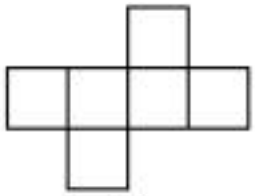
2007-4-7-10

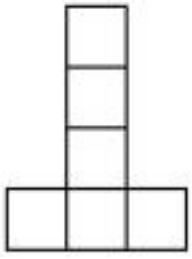
Source: National Assessment of Educational Progress, 2007, Grade 4 Mathematics Assessment.

Which of the following could NOT be folded into a cube?

A. 

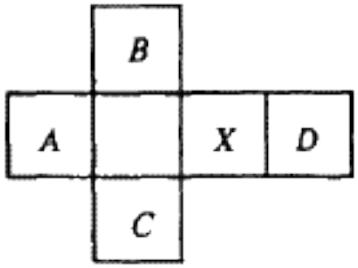
B. 

C. 

D. 

2003-4-6-14
2003-8-6-14

Source: National Assessment of Educational Progress, 2003, Grade 4 and Grade 8 Mathematics Assessments.

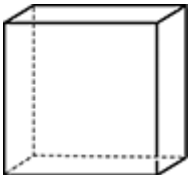


The squares in the figure above represent the faces of a cube which has been cut along some edges and flattened. When the original cube was resting on face *X*, which face was on top?

A. *A*
B. *B*
C. *C*
D. *D*

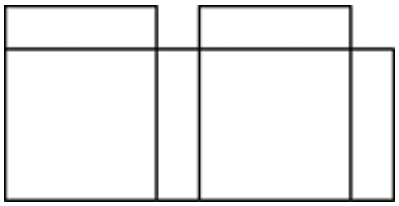
1992-4-5-14
1992-8-5-14

Source: National Assessment of Educational Progress, 1992, Grade 4 and Grade 8 Mathematics Assessments.

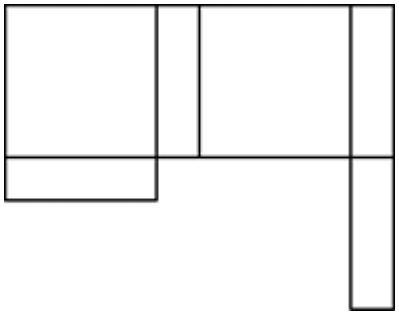


The box pictured above has six faces that do not overlap. The box will unfold into one of the figures below. Which figure is it?

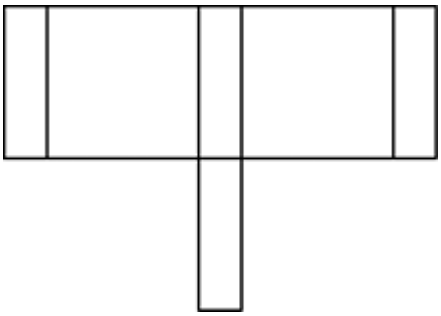
A.



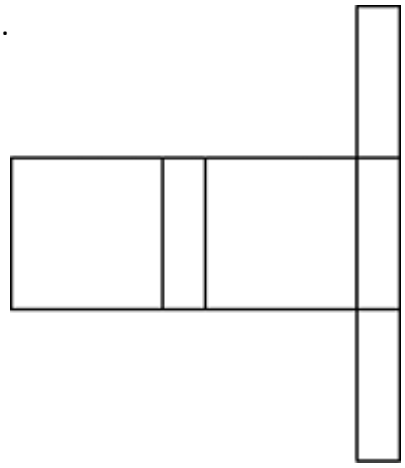
B.



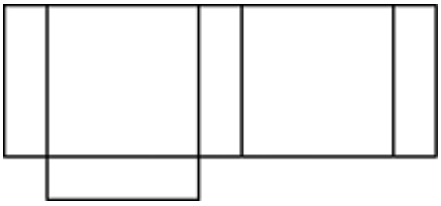
C.



D.



E.



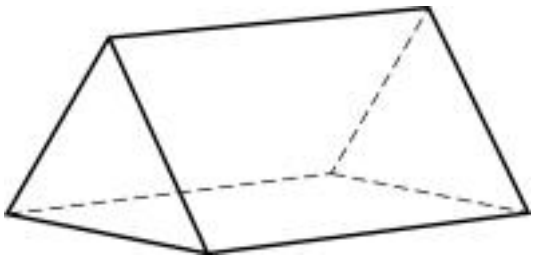
2011-8-9-7

Source: National Assessment of Educational Progress, 2011, Grade 8 Mathematics Assessment.

The paper tube in the figure above is to be cut along the dotted line and opened up. What will be the shape of the flattened piece of paper?

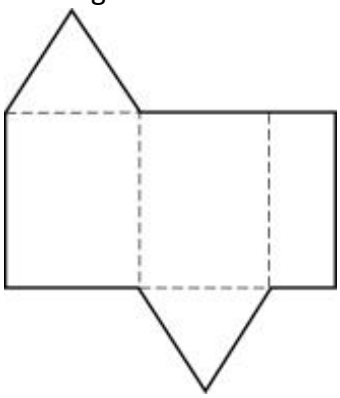
2005-8-3-4

Source: National Assessment of Educational Progress, 2005, Grade 8 Mathematics Assessment.

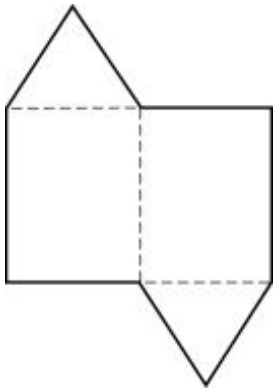


Which of the following can be folded to form the prism above?

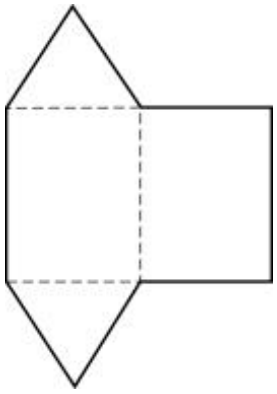
A.

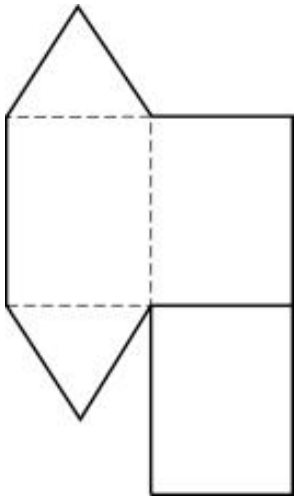


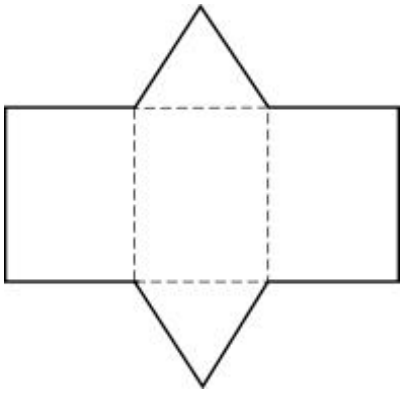
B.



C.

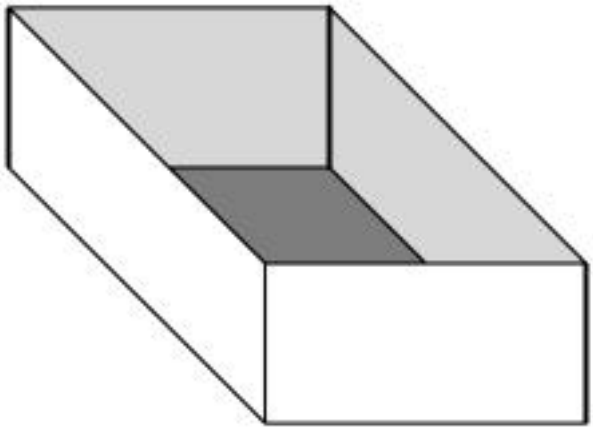


D. 

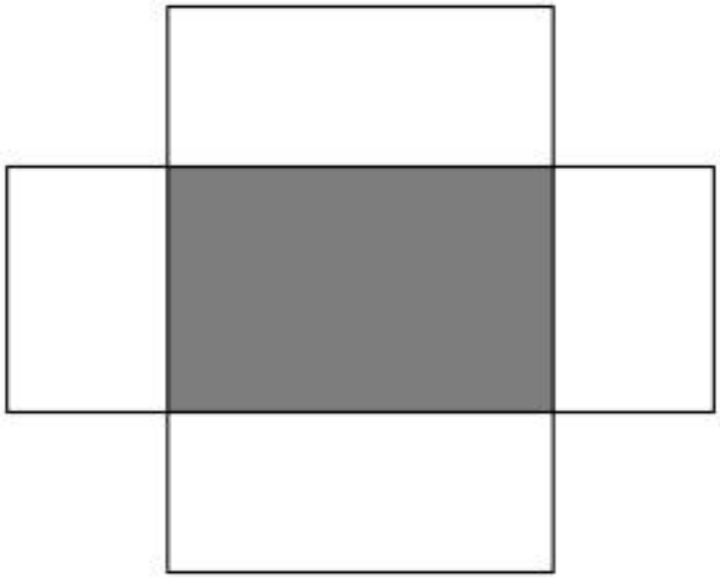
E. 

2005-8-12-16

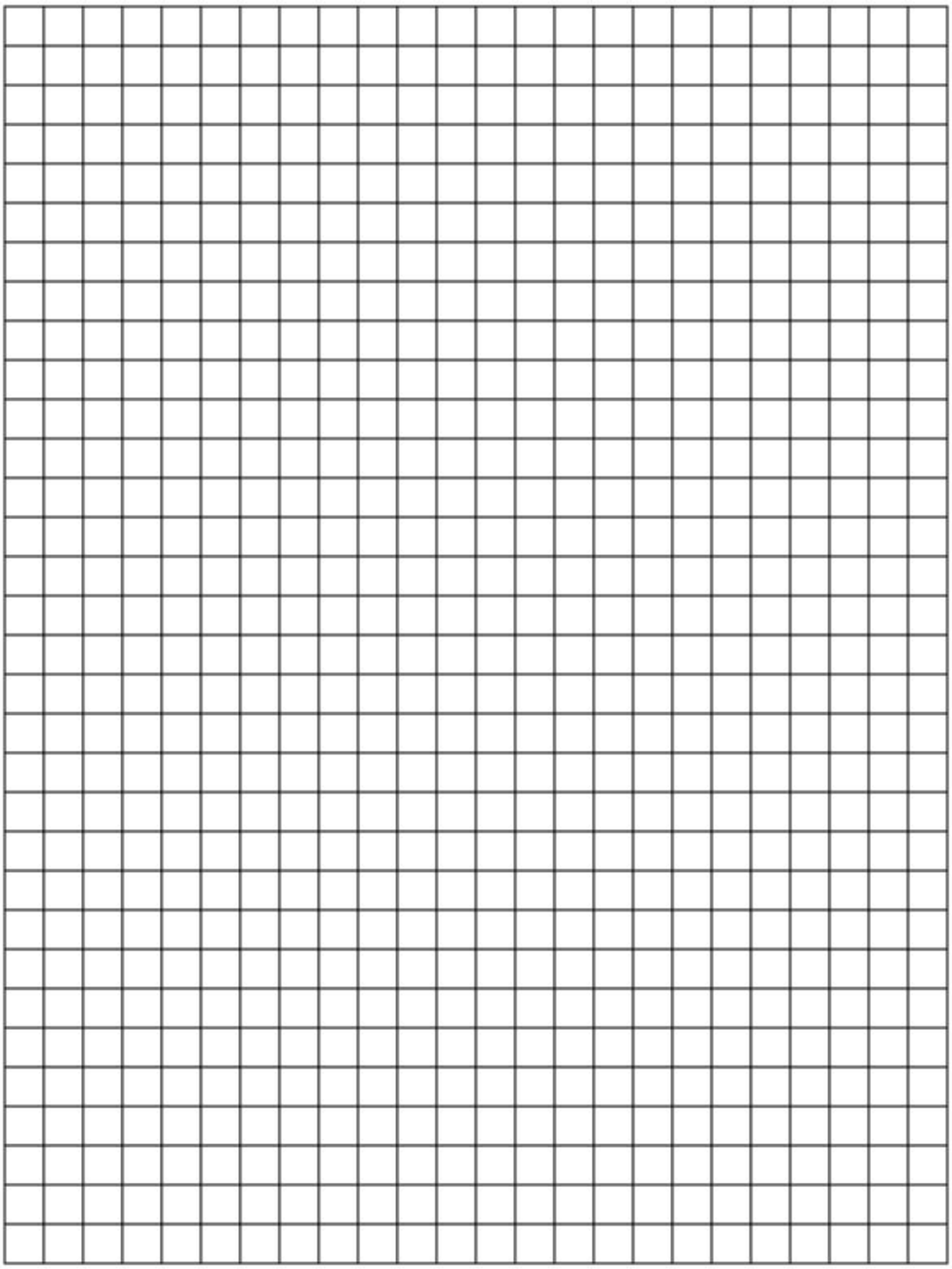
Source: National Assessment of Educational Progress, 2005, Grade 8 Mathematics Assessment.



When the open box shown above is cut along the four darkened edges and then flattened, the result is shown below.

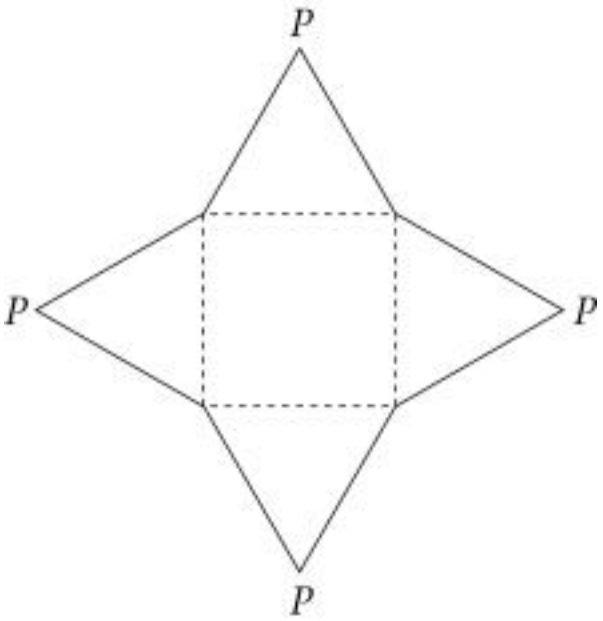


On the grid on the next page, draw two flattened boxes that will fold up into different open boxes. Each box should have a volume of 8 cubic units. Be sure to label your drawings with numbers that show the length, width, and height for each box. Each square on the grid has a side of length 1 unit.



2003-8-10-16

Source: National Assessment of Educational Progress, 2003, Grade 8 Mathematics Assessment.



If the figure above is folded on the dotted lines so that all the points labeled *P* touch each other, what three-dimensional figure will result?

2005-12-4-12

Source: National Assessment of Educational Progress, 2011, Grade 12 Mathematics Assessment.
