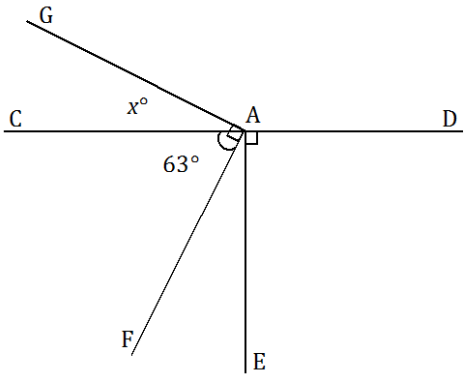
Name _____ Date _____

Lesson 1: Complementary and Supplementary Angles

Exit Ticket

1. Students set up and solve an equation to solve for the value of x. Use the value of x and a relevant angle relationship in the diagram to determine the measure of $\angle EAF$.



2. The measurement of the supplement of an angle is $39°$ more than half the angle. Find the measurement of the angle and its supplement.

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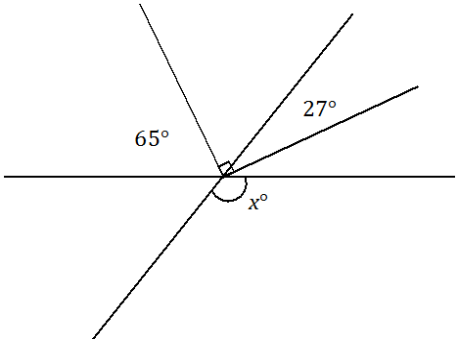
Name _____ Date _____

Lesson 2: Solving for Unknown Angles Using Equations

Exit Ticket

Set up and solve an equation to find the value of x. Explain why your answer is reasonable.



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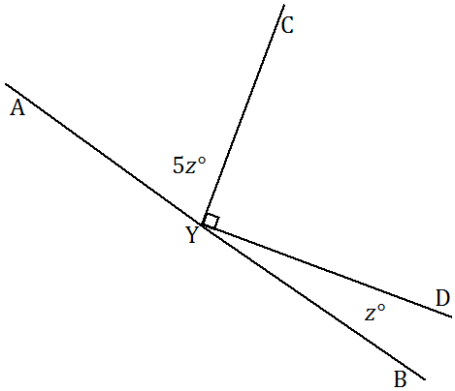
Name _____ Date _____

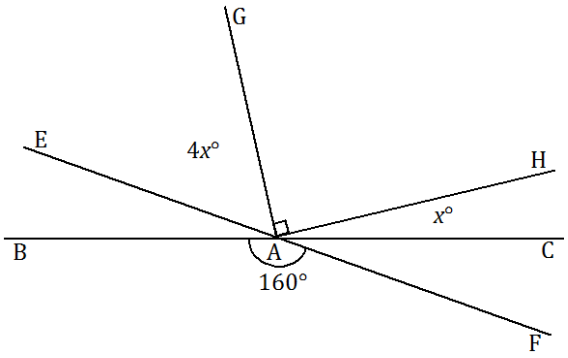
Lesson 3: Solving for Unknown Angles Using Equations

Exit Ticket

1. Two rays have a common vertex on a line. Set up and solve an equation to find the value of z. Find the measurements of angles $\angle AYC$ and $\angle DYB$.



2. Two lines meet at the common vertex of two rays. Set up and solve an equation to find the value of x. Find the measurements of angles $\angle CAH$ and $\angle EAG$.



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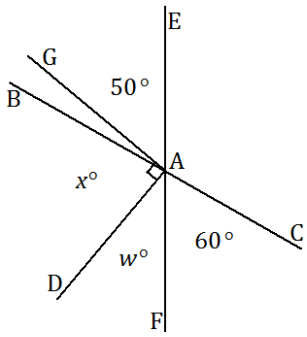
Name _____ Date _____

Lesson 4: Solving for Unknown Angles Using Equations

Exit Ticket

BC and EF meet at A. AG and AD form a right angle. Set up and solve an equation to find the values of x and w.



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Name _____ Date _____

Lesson 5: Identical Triangles

Exit Ticket

1. The following triangles are identical and have the correspondence $\triangle ABC \leftrightarrow \triangle YZX$. Find the measurements for each of the following sides and angles.

$AB =$ _____

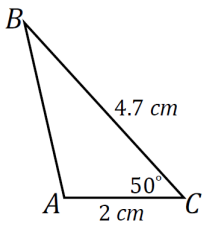
$BC =$ _____

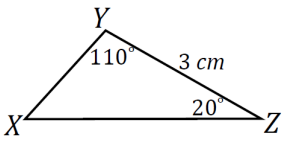
_____ $= XY$

$\angle A =$ _____

$\angle B =$ _____

_____ $= \angle X$





2. Explain why correspondences are useful.

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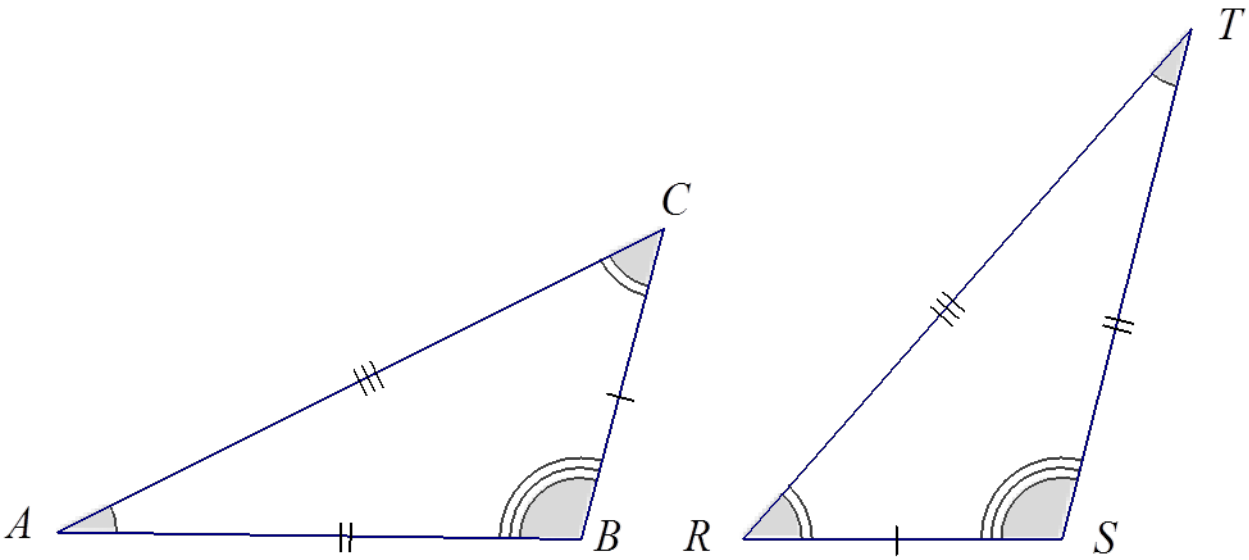
Example 2 Scaffolding Supplement



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Name _____ Date _____

Lesson 6: Drawing Geometric Shapes

Exit Ticket

1. Draw a square $PQRS$ with side length equal to 5 cm. Label side and angle measurements.

2. Draw a segment AB 6 cm in length. Draw a circle whose diameter is segment AB.

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Lesson 7: Drawing Parallelograms

Exit Ticket

Use what you know about drawing parallel lines with a setsquare to draw square $ABCD$ with $AB = 5$ cm. Explain how you created your drawing.

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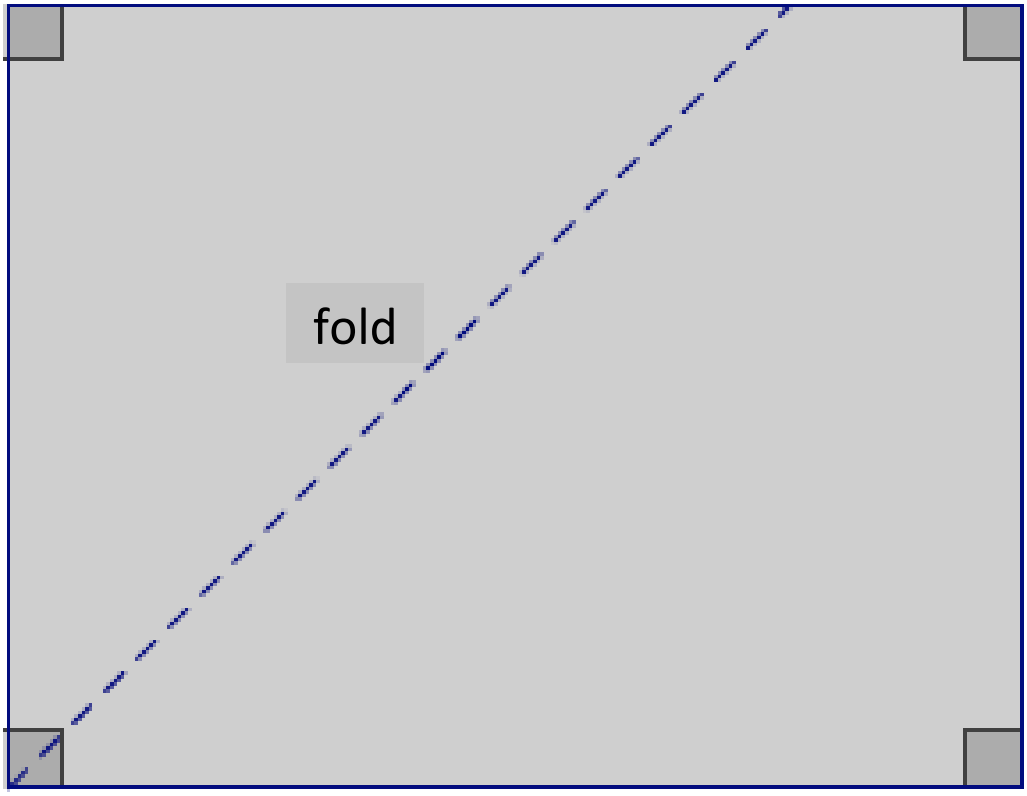
Supplement



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Lesson 8: Drawing Triangles

Exit Ticket

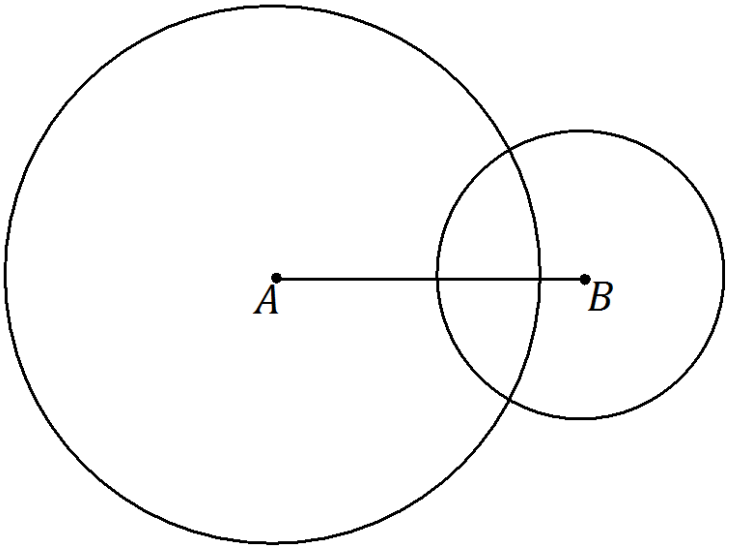
1. A student is given the following three side lengths of a triangle to use to draw a triangle.

_____

_____

_____

The student uses the longest of the three segments as side AB of triangle $\triangle ABC$. Explain what the student is doing with the two shorter lengths in the work below. Then complete drawing the triangle.



2. Explain why the three triangles constructed in the lesson today (Exploratory Challenge parts (c), (d), and (e)) were non-identical.

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Lesson 9: Conditions for a Unique Triangle—Three Sides and Two Sides and the Included Angle

Exit Ticket

Choose either the three sides condition or the two sides and included angle condition, and explain why the condition determines a unique triangle.

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Lesson 10: Conditions for a Unique Triangle—Two Angles and a Given Side

Exit Ticket

1. $\triangle ABC$ has angles $\angle A = 50°$ and $\angle C = 90°$ and side $AB = 5.5$ cm. Draw triangle $\triangle A'B'C'$ under the same condition. Under what condition is $\triangle A'B'C'$ drawn? Use your construction to explain why $\triangle A'B'C'$ is or is not identical to $\triangle ABC$.

2. $\triangle PQR$ has angles $\angle Q = 25°$ and $\angle R = 40°$ and side $QR = 6.5$ cm. Draw triangle $\triangle P'Q'R'$ under the same condition. Under what condition is $\triangle P'Q'R'$ drawn? Use your construction to explain why $\triangle P'Q'R'$ is or is not identical to $\triangle PQR$.

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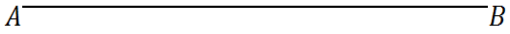
Lesson 11: Conditions on Measurements that Determine a Triangle

Exit Ticket

1. What is the maximum and minimum whole-number side length for $\triangle XYZ$ with given side lengths of 3 cm and 5 cm? Please explain why.

2. Jill has not yet studied the angle measurement requirements to form a triangle. She begins to draw side AB of $\triangle ABC$ and considers the following angle measurements for $\angle A$ and $\angle B$. Describe the drawing that results from each set.



a. $45°$ and $135°$

b. $45°$ and $45°$

c. $45°$ and $145°$

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Lesson 12: Unique Triangles—Two Sides and a Non-Included Angle

Exit Ticket

So far, we have learned about four conditions that determine unique triangles: three sides, two sides and an included angle, two angles and an included side, and two angles and the side opposite a given angle.

a. In this lesson, we studied the criterion two sides and a non-included angle. Which case of this criterion determines a unique triangle?

b. Provided AB has length 5 cm, BC has length 3 cm, and the measurement of $\angle A$ is $30°$, draw $\triangle ABC$, and describe why these conditions do not determine a unique triangle.

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Lesson 13: Checking for Identical Triangles

Exit Ticket

Angles $\angle A$ and $\angle D$ are equal in measure. Draw two triangles around each angle and mark parts appropriately so that the triangles are identical; use angles $\angle A$ and $\angle D$ as part of the chosen condition. Write a correspondence for the triangles.

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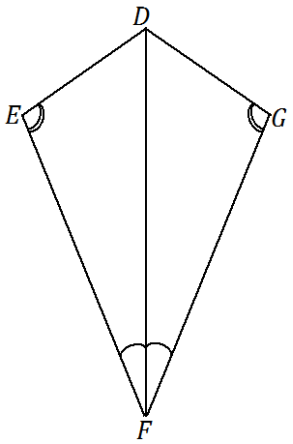
Lesson 14: Checking for Identical Triangles

Exit Ticket

Are triangles $\triangle DEF$ and $\triangle DGF$ identical, not identical, or not necessarily identical? Justify your reasoning. If the relationship between the two triangles yields information that establishes a condition, describe the information. If the triangles are identical, write a triangle correspondence that matches the sides and angles.



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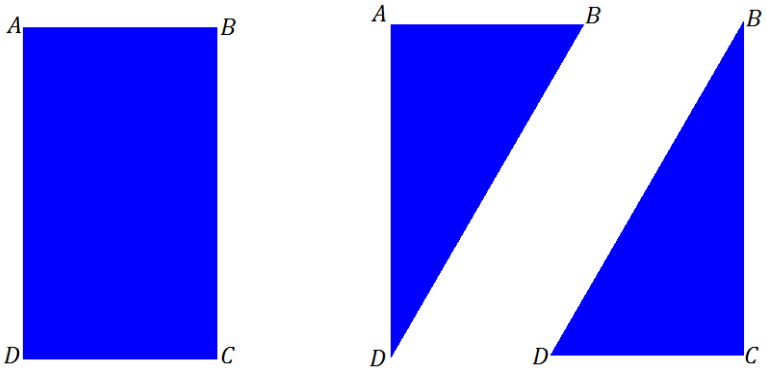
Name _____ Date _____

Lesson 15: Using Unique Triangles to Solve Real-World and Mathematical Problems

Exit Ticket

Alice is cutting wrapping paper to size to fit a package. How should she cut the rectangular paper into two triangles to ensure that each piece of wrapping paper is the same? Use your knowledge of conditions that determine unique triangles to justify that the resulting pieces from the cut are the same.



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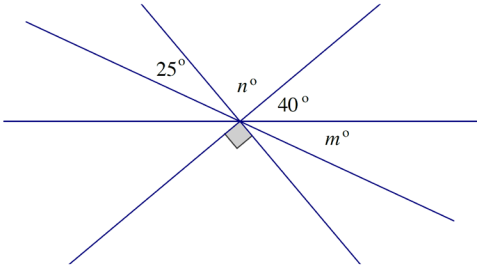
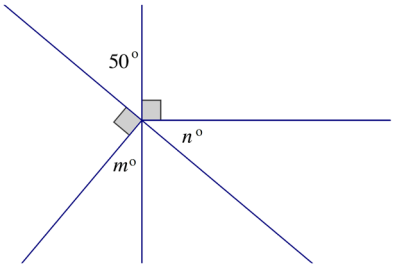
1. In each problem, set up and solve an equation for the unknown angles.

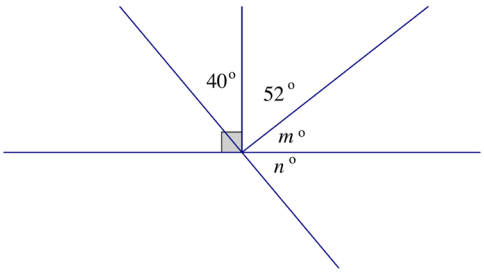
   a. Four lines meet at a point. Find the measures of m and n.



   b. Two lines meet at the vertex of two rays. Find the measures of m and n.



   c. Two lines meet at a point that is the vertex of two rays. Find the measures of m and n.



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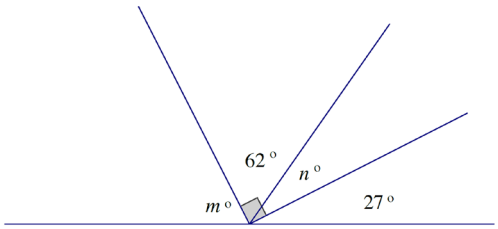
d. Three rays have a common vertex on a line. Find the measures of m and n.



2. Use tools to construct a triangle based on the following given conditions.

a. If possible, use your tools to construct a triangle with angle measurements $20°$, $55°$, and $105°$ and leave evidence of your construction. If it is not possible, explain why.

b. Is it possible to construct two different triangles that have the same angle measurements? If it is, construct examples that demonstrate this condition, and label all angle and length measurements. If it is not possible, explain why not.

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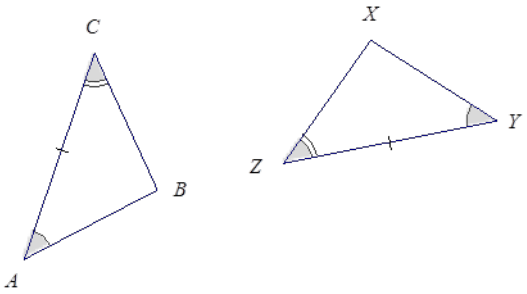
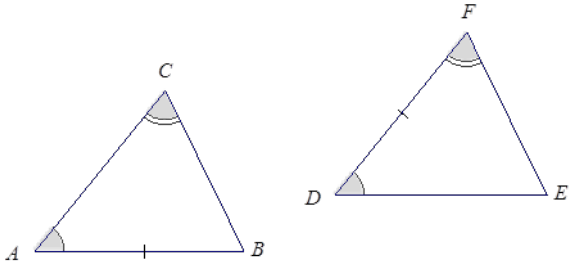
3. In each of the following problems two triangles are given. For each: (1) state if there are sufficient or insufficient conditions to show the triangles are identical, and (2) explain your reasoning.

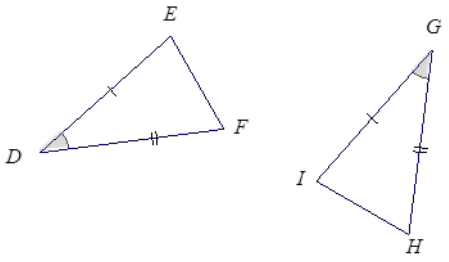
a.



b.



c.



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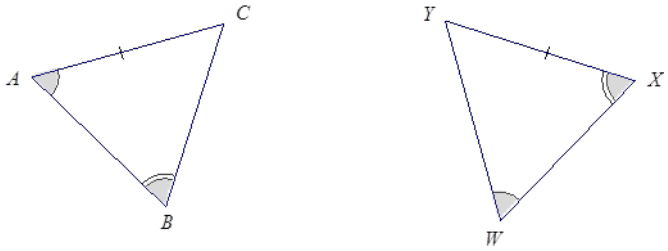
d.



4. Use tools to draw rectangle $ABCD$ with $AB = 2$ cm and $BC = 6$ cm. Label all vertices and measurements.

5. The measures of two complementary angles have a ratio of $3 : 7$. Set up and solve an equation to determine the measurements of the two angles.

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6. The measure of the supplement of an angle is $12°$ less than the measure of the angle. Set up and solve an equation to determine the measurements of the angle and its supplement.

7. Three angles are at a point. The ratio of two of the angles is $2:3$, and the remaining angle is $32°$ more than the larger of the first two angles. Set up and solve an equation to determine the measures of all three angles.

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8. Draw a right triangle according to the following conditions, and label the provided information. If it is not possible to draw the triangle according to the conditions, explain why not. Include a description of the kind of figure the current measurements allow. Provide a change to the conditions that makes the drawing feasible.

   a. Construct a right triangle $\triangle ABC$ so that $AB = 3$ cm, $BC = 4$ cm, and $CA = 5$ cm; the measure of angle B is $90°$.

   b. Construct triangle $\triangle DEF$ so that $DE = 4$ cm, $EF = 5$ cm, and $FD = 11$ cm; the measure of angle D is $50°$.

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Name _____ Date _____

Lesson 16: Slicing a Right Rectangular Prism with a Plane

Exit Ticket

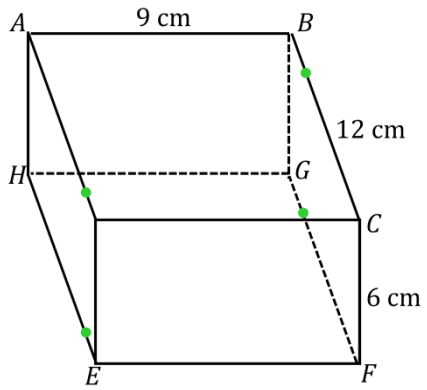
In the following figures, use a straightedge to join the points where a slicing plane meets with a right rectangular prism to outline the slice.

i. Label the vertices of the rectangular slice $WXYZ$.

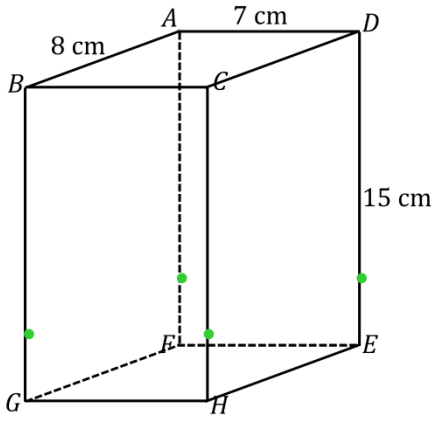
ii. State any known dimensions of the slice.

iii. Describe two relationships slice $WXYZ$ has in relation to faces of the right rectangular prism.

1.



2.



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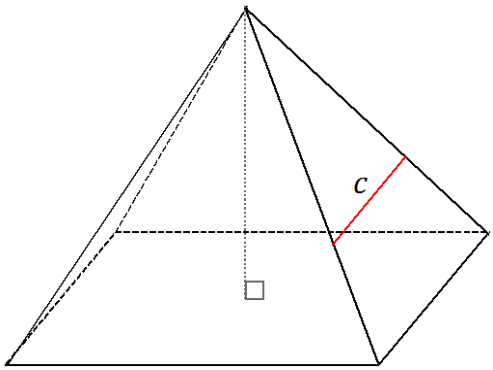
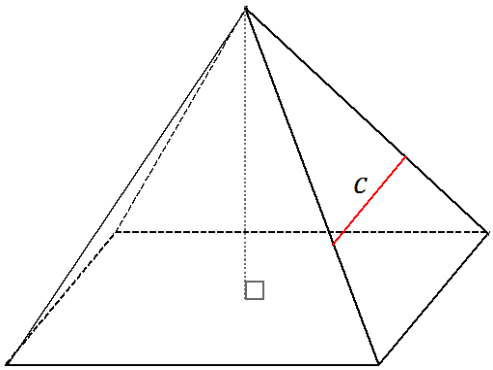
Lesson 17: Slicing a Right Rectangular Pyramid with Plane

Exit Ticket

Two copies of the same right rectangular pyramid are shown below. Draw in the slice perpendicular to the base and the slice parallel to the base. Then, sketch the resulting slices as two-dimensional figures.



Slice Perpendicular to Base



Slice Parallel to Base

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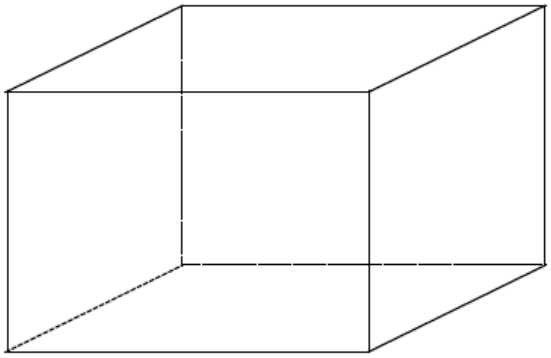
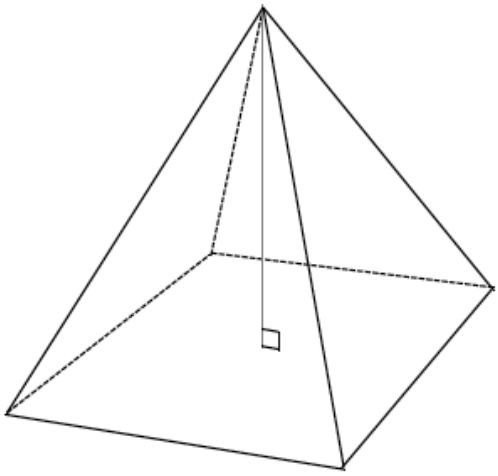
Lesson 18: Slicing on an Angle

Exit Ticket

Draw a slice that has the maximum possible number of sides for each solid. Explain how you got your answer.





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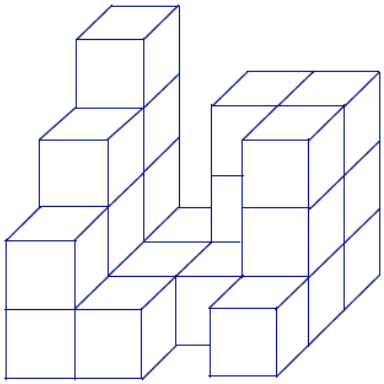
Lesson 19: Understanding Three-Dimensional Figures

Exit Ticket

1. The following three-dimensional figure is built on a tabletop. If slices parallel to the tabletop are taken of this figure, then what would each slice look like?



2. Given the level slices in the figure, how many cubes are in the figure?

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Lesson 20: Real-World Area Problems

Exit Ticket

A homeowner called in a painter to paint bedroom walls and ceiling. The bedroom is 18 ft. long, 12 ft. wide, and 8 ft. high. The room has two doors each 3 ft. by 7 ft. and three windows each 3 ft. by 5 ft. The doors and windows do not have to be painted. A gallon of paint can cover 300 ft^2. A hired painter claims he will need 4 gal. Show that the estimate is too high.

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Lesson 21: Mathematical Area Problems

Exit Ticket

1. Create an area model to represent this product: $(x + 4)\,(x + 2)$.

2. Write two different expressions that represent the area.

3. Explain how each expression represents different information about the situation.

4. Show that the two expressions are equal using the distributive property.

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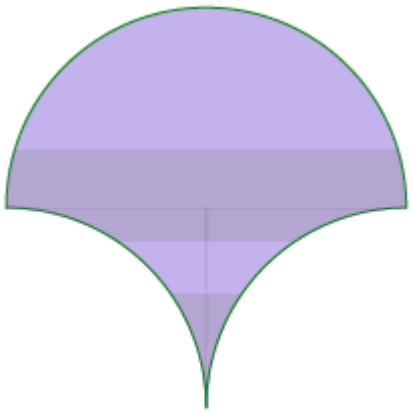
Lesson 22: Area Problems with Circular Regions

Exit Ticket

A circle with a 10 cm radius is cut into a half circle and two quarter circles. The three circular arcs bound the region below.

a. Write and explain a numerical expression that represents the area.

b. Then find the area of the figure.



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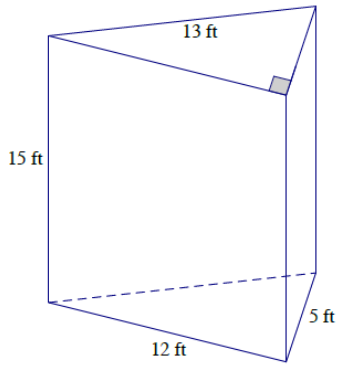
Name _____ Date _____

Lesson 23: Surface Area

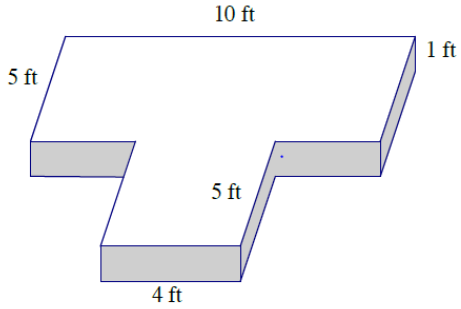
Exit Ticket

Determine and explain how to find the surface area of the following right prisms.

1.



2.



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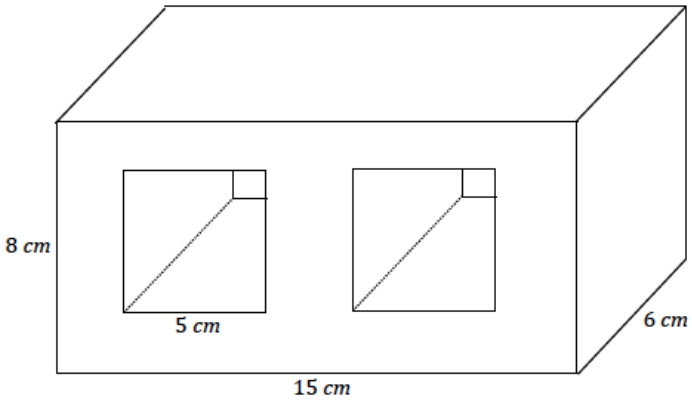
Lesson 24: Surface Area

Exit Ticket

Determine the surface area of the right rectangular prism after the two square holes have been drilled. Explain how you determined the surface area.



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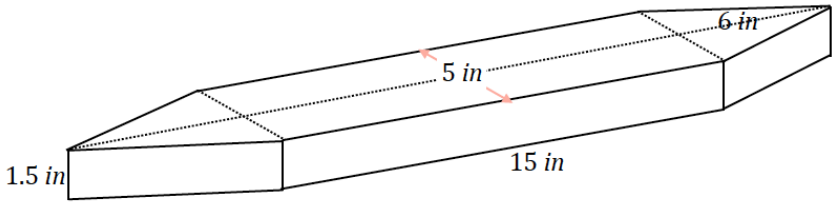
Lesson 25: Volume of Right Prisms

Exit Ticket

Determine the volume of the following prism. Explain how you found the volume.



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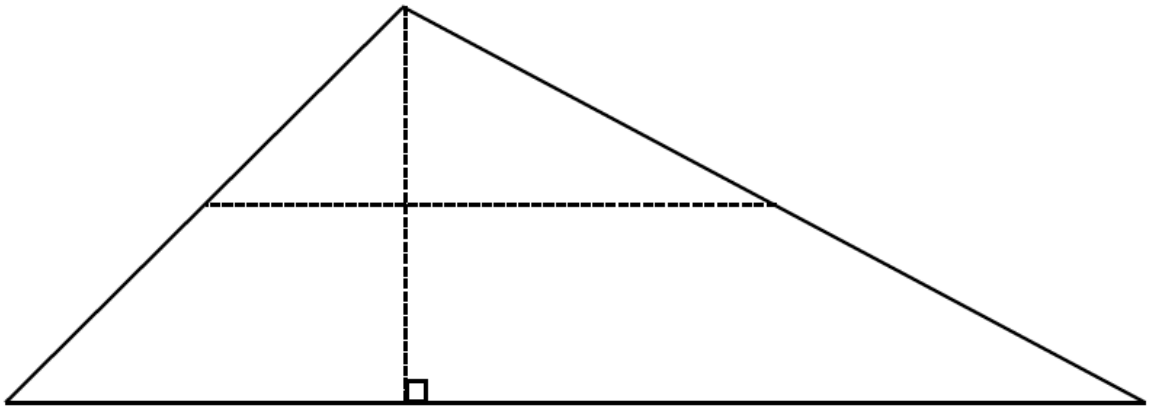
Opening Exercise



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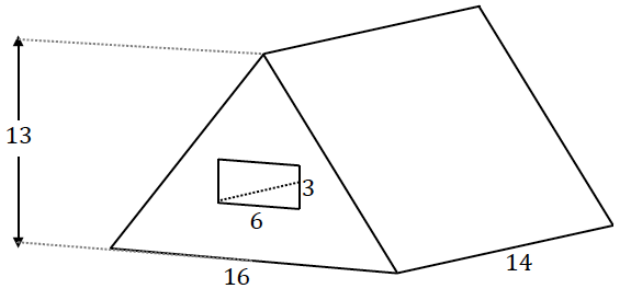
Lesson 26: Volume of Composite Three-Dimensional Objects

Exit Ticket

A triangular prism has a rectangular prism cut out of it from one base to the opposite base, as shown in the figure. Determine the volume of the figure, provided all dimensions are in millimeters.



Is there any other way to determine the volume of the figure? If so, please explain.

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Lesson 27: Real-World Volume Problems

Exit Ticket

Jim wants to know how much his family spends on water for showers. Water costs $1.50 for 1,000 gallons. His family averages 4 showers per day. The average length of a shower is 10 minutes. He places a bucket in his shower and turns on the water. After one minute, the bucket has 2.5 gallons of water. About how much money does his family spend on water for showers in a 30-day month?

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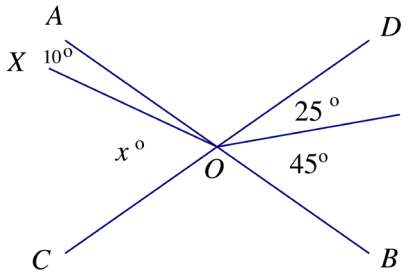
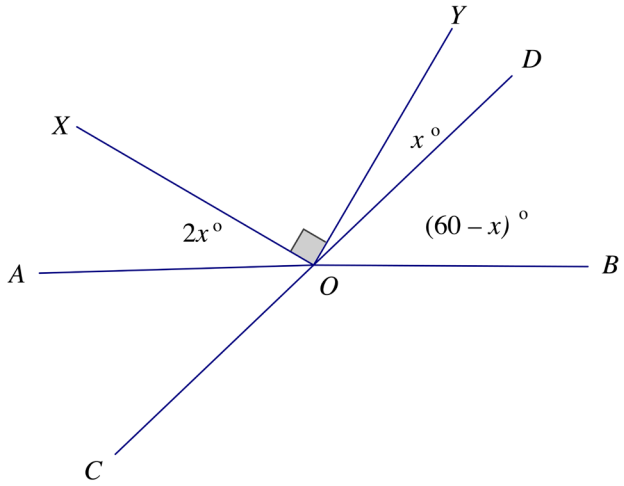
1. In the following two questions, AB and CD are straight lines. When necessary, assume that seemingly straight lines are indeed straight lines. Determine the measures of the indicated angles.

   a. Find the measures of $\angle XOC$.



   b. Find the measures of $\angle AOX$, $\angle YOD$, and $\angle DOB$.



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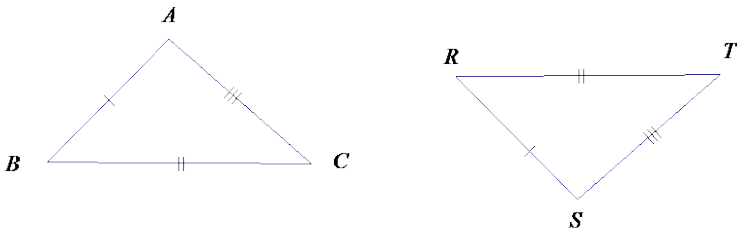
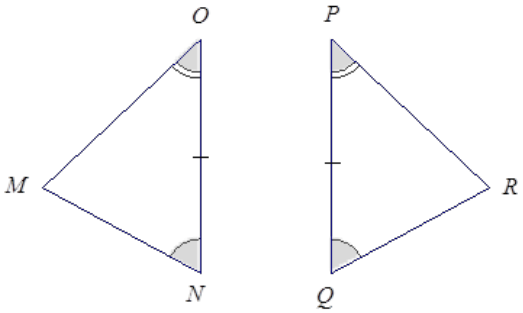
2. Is it possible to draw two different triangles that both have angle measurements of $40°$ and $50°$ and a side length of 5 cm? If it is possible, draw examples of these conditions, and label all vertices and angle and side measurements. If it is not possible, explain why.

3. In each of the following problems two triangles are given. For each: (1) State if there are sufficient or insufficient conditions to show the triangles are identical, and (2) Explain your reasoning.

a.



b.



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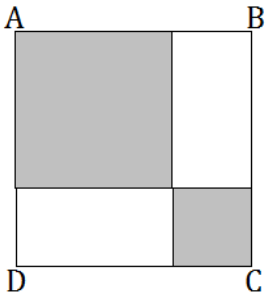
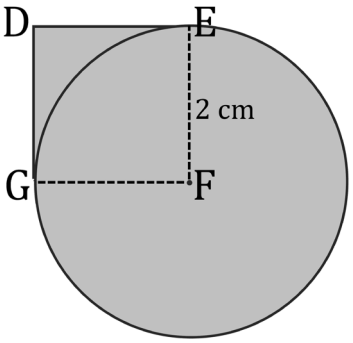
4. In the following diagram, the length of one side of the smaller shaded square is $\frac{1}{3}$ the length of square $ABCD$. What percent of square $ABCD$ is shaded? Provide all evidence of your calculations.



5. The side of square $DEFG$, $EF = 2$ cm, is also the radius of circle C_F. What is the area of the entire shaded region? Provide all evidence of your calculations.



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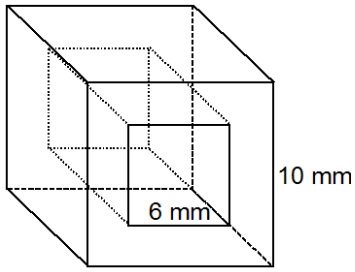
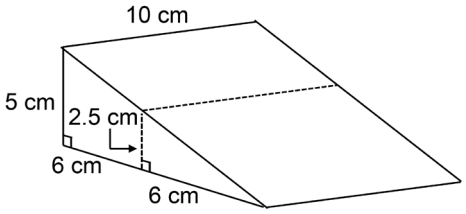
6. For his latest design, a jeweler hollows out crystal cube beads (like the one in the diagram) through which to thread the chain of a necklace. If the edge of the crystal cube is 10 mm, and the edge of the square cut is 6 mm, what is the volume of one bead? Provide all evidence of your calculations.



7. John and Joyce are sharing a piece of cake with the dimensions shown in the diagram. John is about to cut the cake at the mark indicated by the dotted lines. Joyce says this cut will make one of the pieces three times as big as the other. Is she right? Justify your response.



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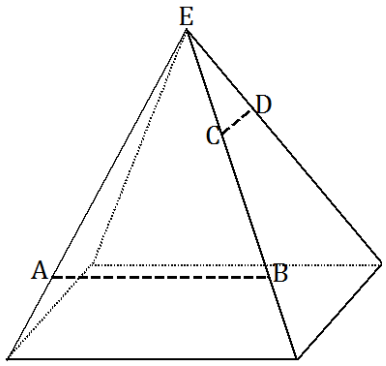
8. A tank measures 4 ft. in length, 3 ft. in width, and 2 ft. in height. It is filled with water to a height of 1.5 ft. A typical brick measures a length of 9 in., a width of 4.5 in., and a height of 3 in. How many whole bricks can be added before the tank overflows? Provide all evidence of your calculations.

9. Three vertical slices perpendicular to the base of the right rectangular pyramid are to be made at the marked locations: (1) through AB, (2) through CD, and (3) through vertex E. Based on the relative locations of the slices on the pyramid, make a reasonable sketch of each slice. Include the appropriate notation to indicate measures of equal length:



(1) Slice through AB	(2) Slice through CD	(3) Slice through vertex E

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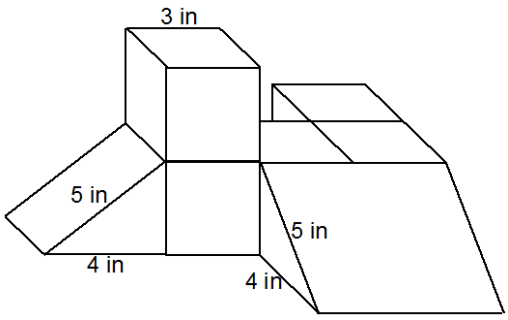
10. Five three-inch cubes and two triangular prisms have been glued together to form the composite three-dimensional figure shown in the diagram. Find the surface area of the figure, including the base. Provide all evidence of your calculations.



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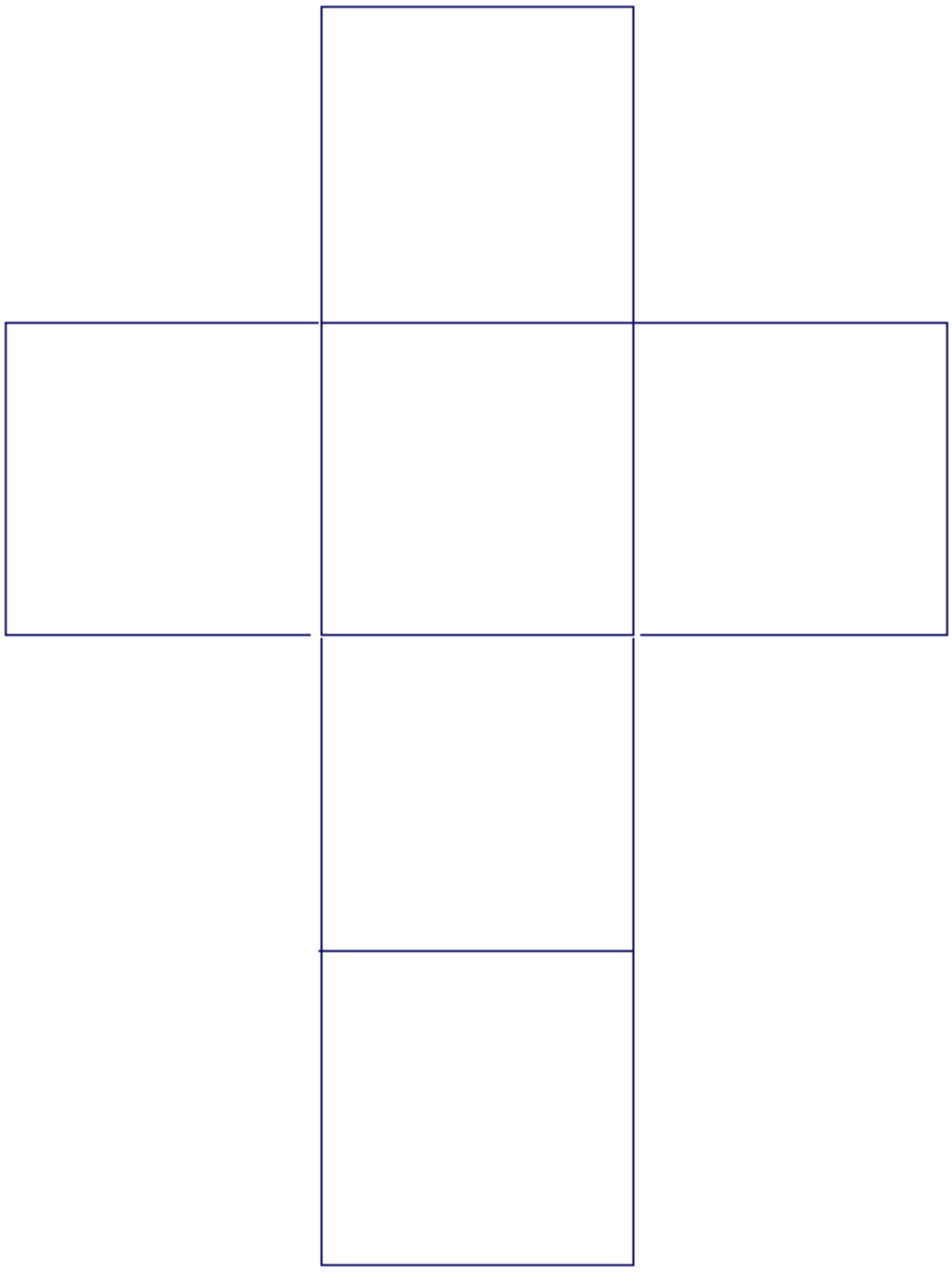

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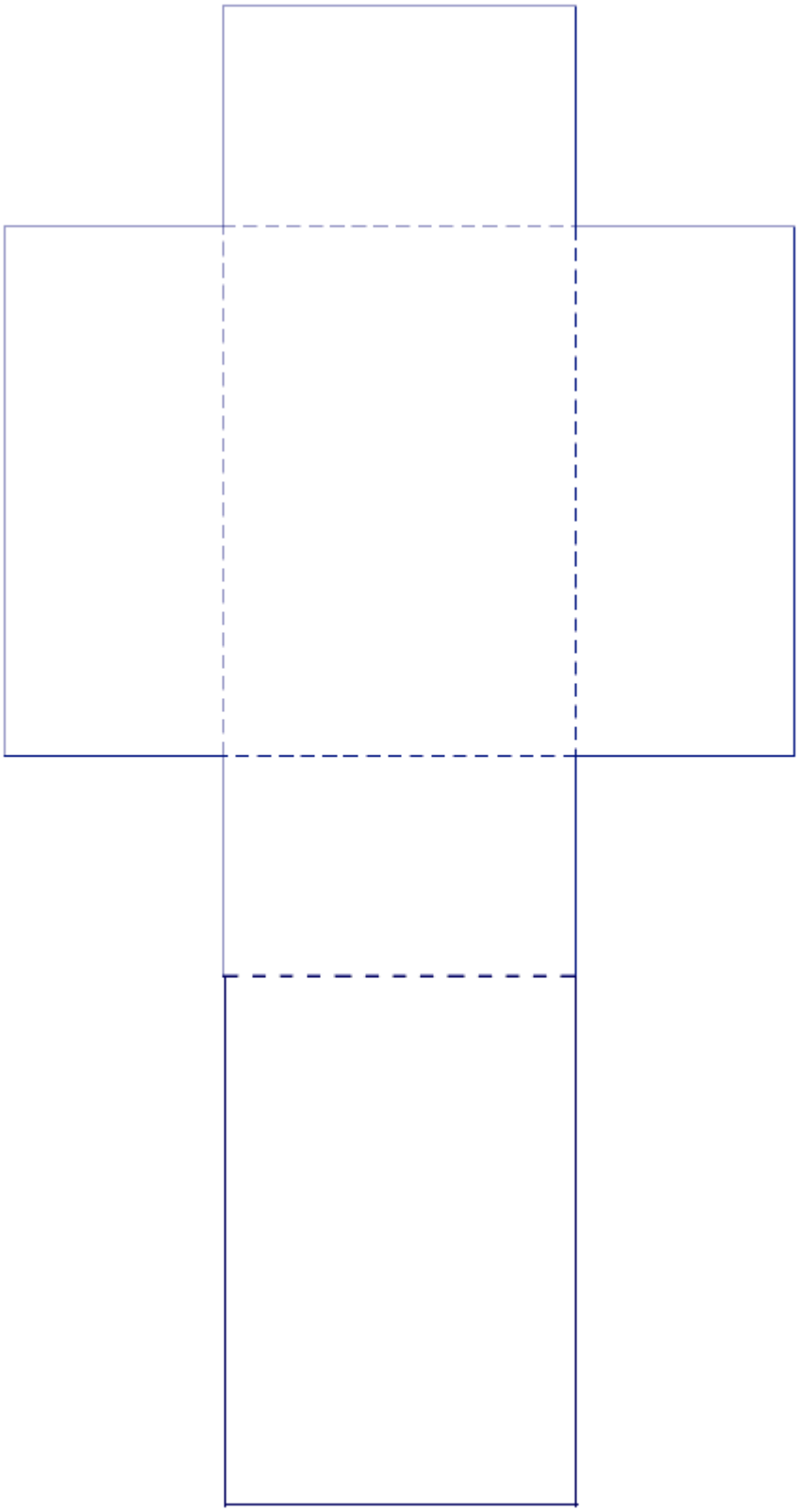

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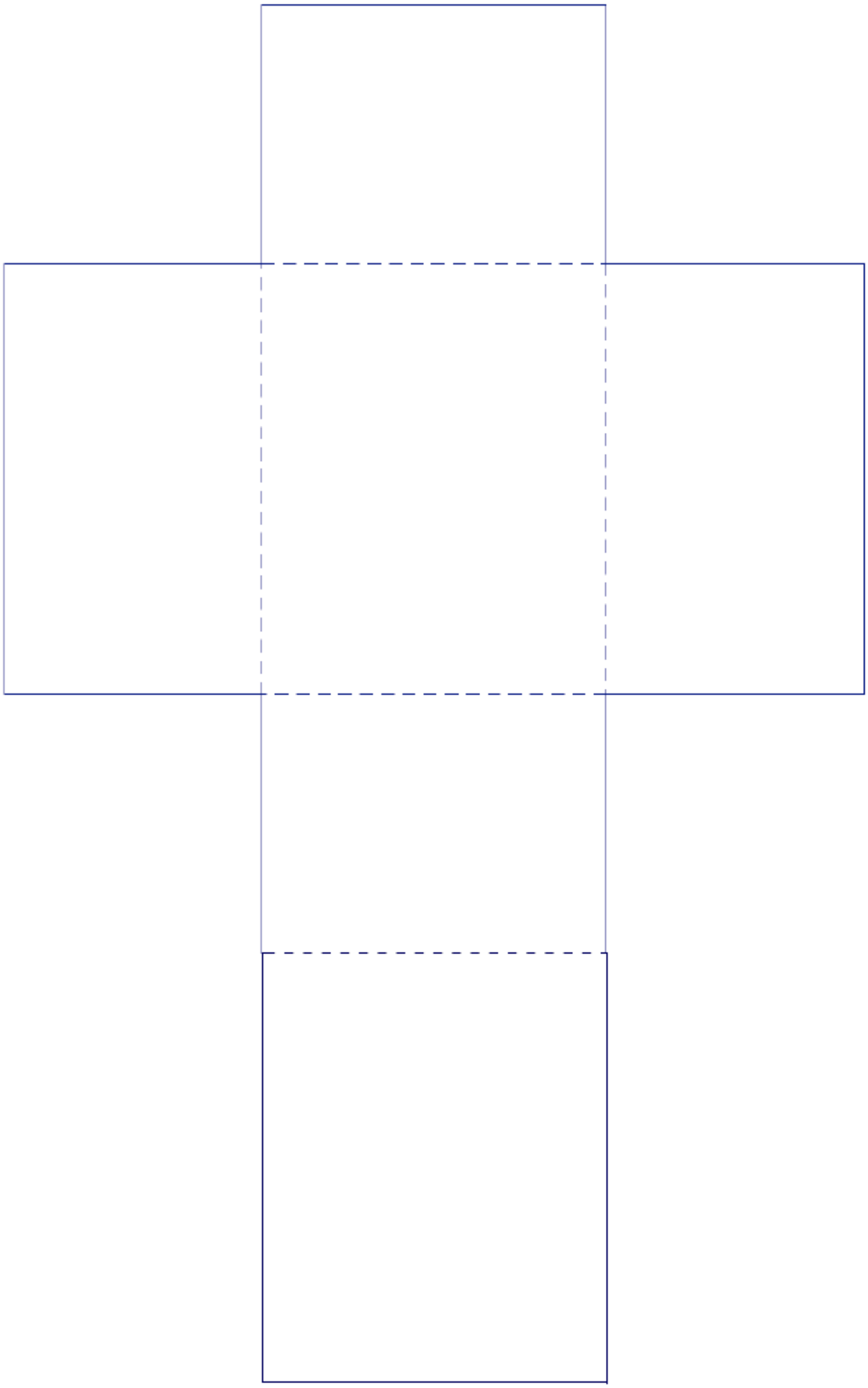

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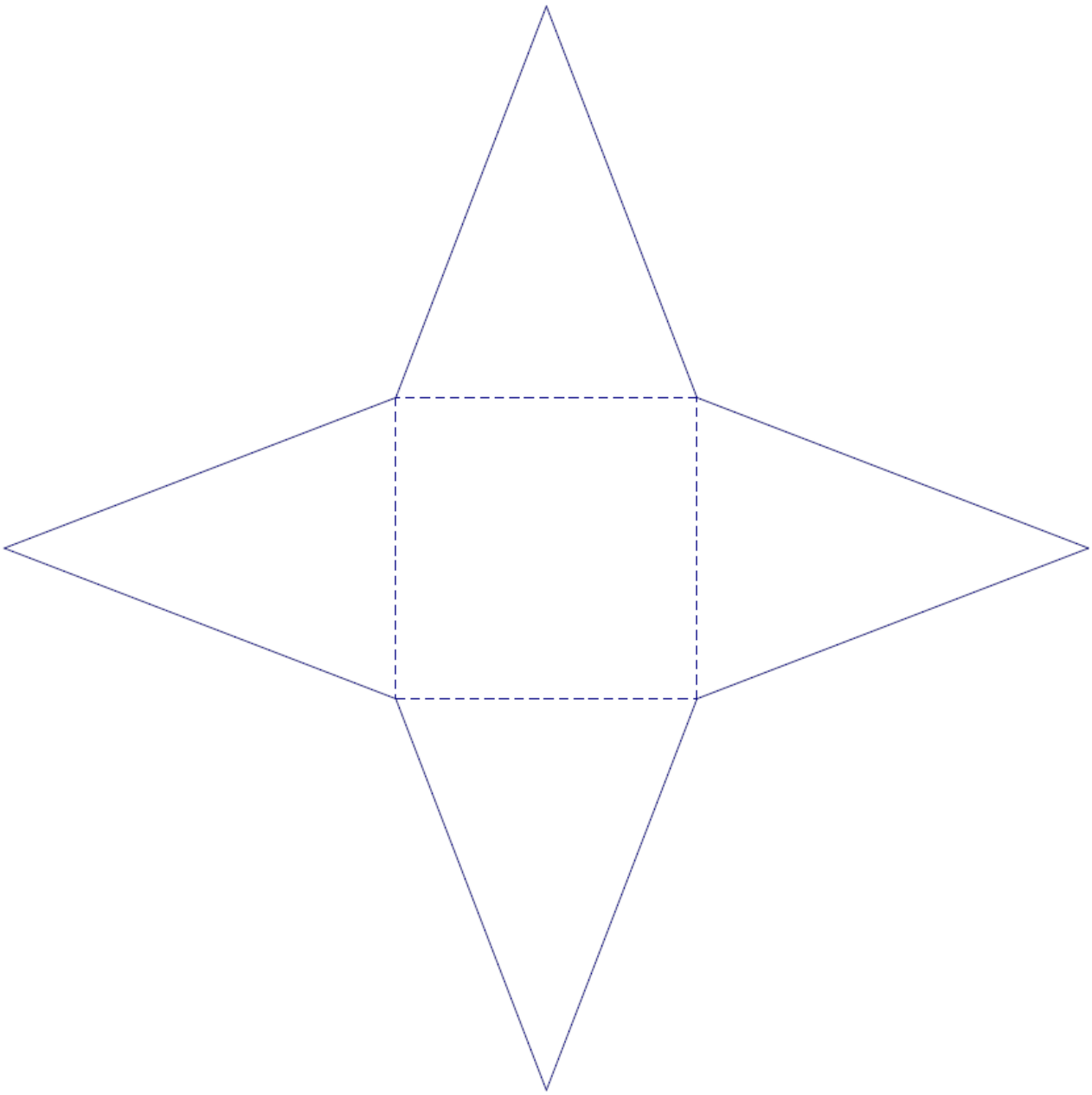

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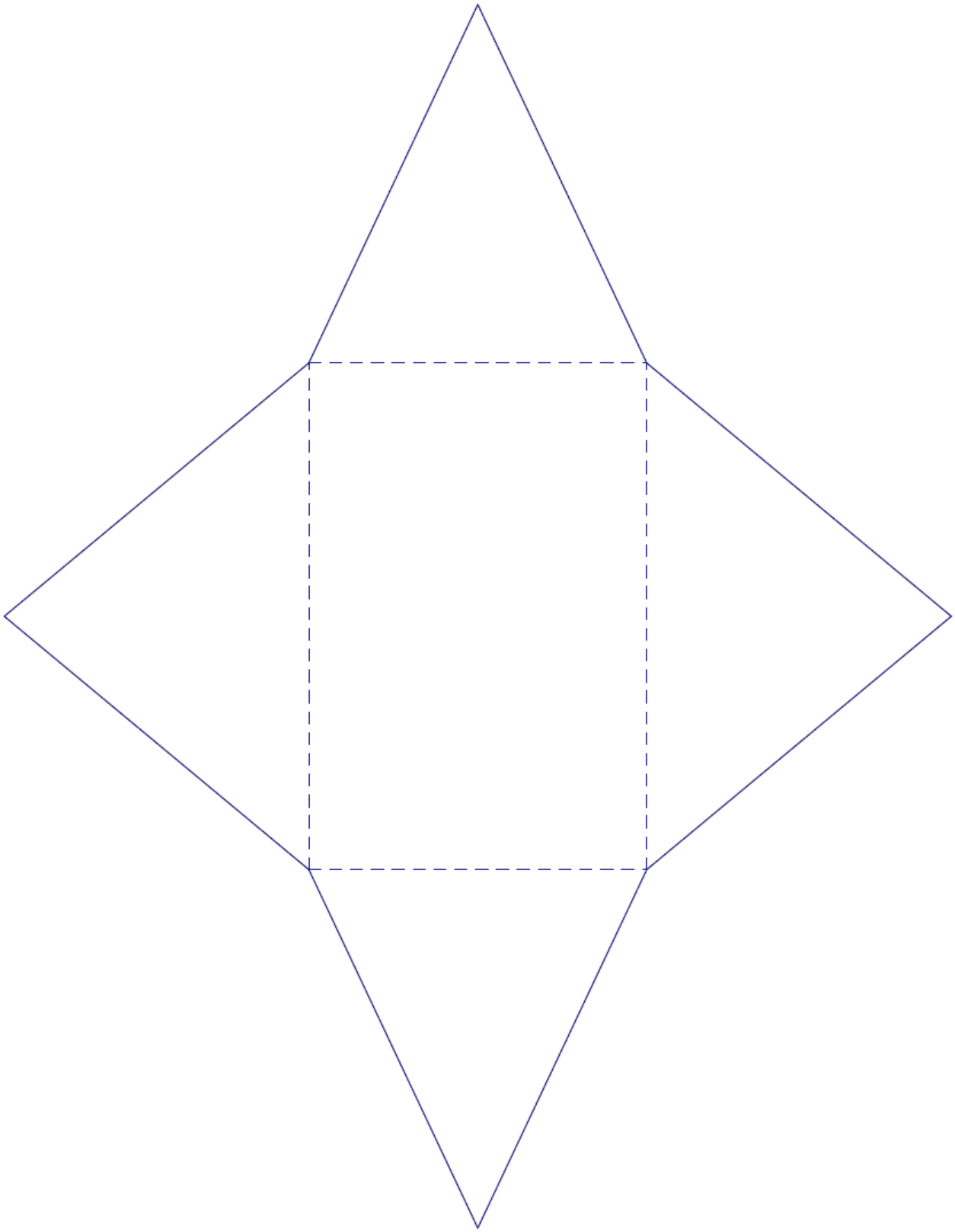

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