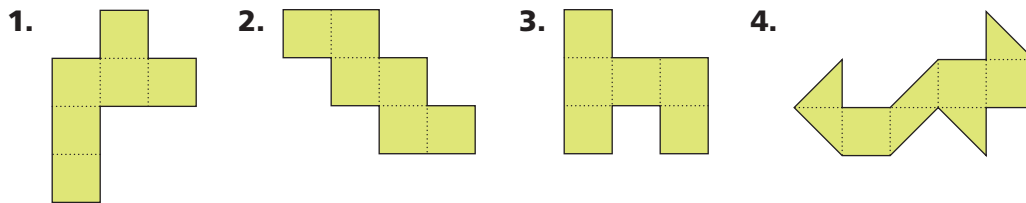
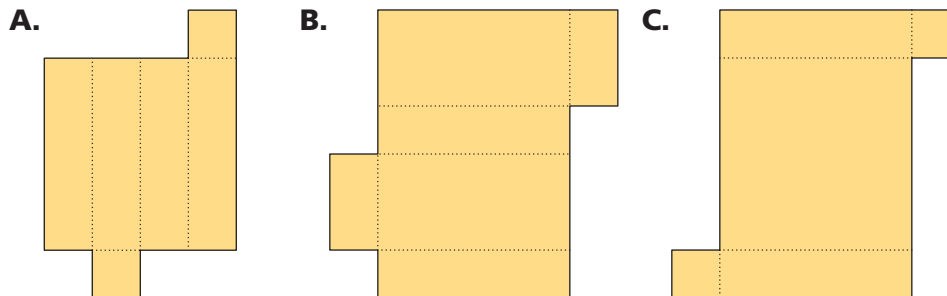


Applications

For Exercises 1–4, decide if you can fold the net along the lines to form a closed cubic box. If you are unsure, draw the pattern on grid paper and cut it out to experiment.

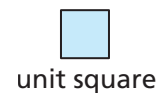


5. Which of these nets could be folded along the lines to form a closed rectangular box?



6. Do parts (a)–(c) for each pattern from Exercise 5 that forms a closed rectangular box.

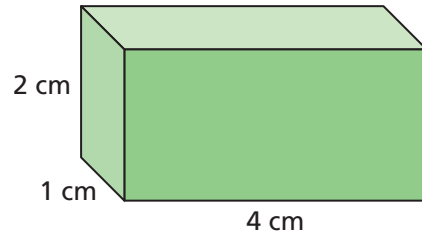
a. Use the unit square shown to help you find the dimensions of the box.



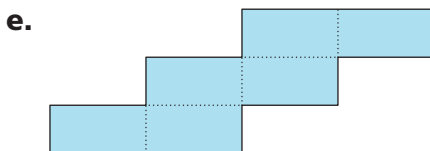
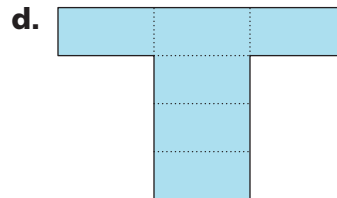
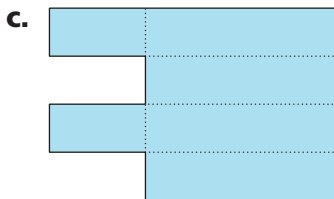
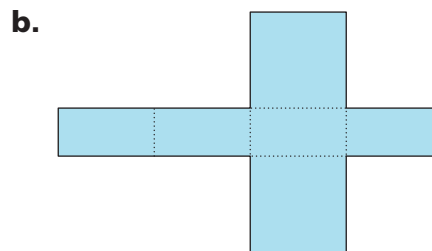
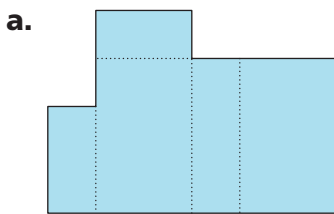
b. Find the total area, in square units, of all the faces of the box.

c. Find the number of unit cubes it would take to fill the box.

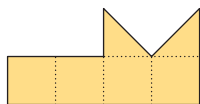
7. This closed rectangular box does not have square ends.



- What are the dimensions of the box?
 - On centimeter grid paper, sketch two nets for the box.
 - Find the area, in square centimeters, of each net.
 - Find the total area of all the faces of the box. How does your answer compare with the areas you found in part (c)?
8. Which of these patterns can be folded along the lines to form a closed rectangular box? Explain.



9. Can you fold this net along the lines to form an open cubic box?
Explain your reasoning.



For each box described in Exercises 10–13:

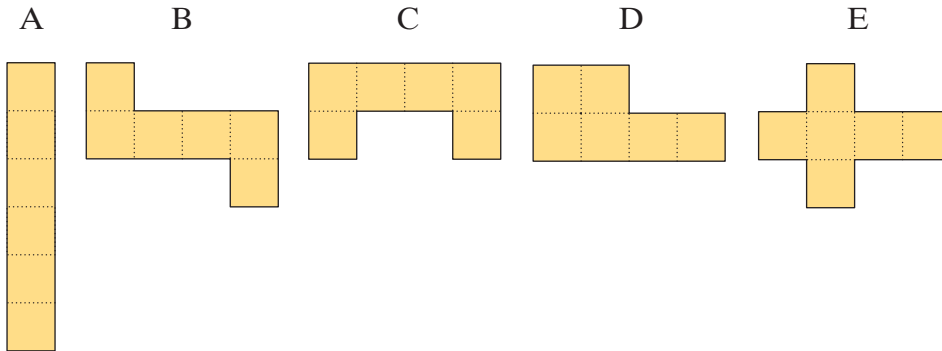
- Make a sketch of the box and label the dimensions.
 - Draw a net.
 - Find the area of each face.
 - Find the total area of all the faces.
10. a rectangular box with dimensions
2 centimeters \times 3 centimeters \times 5 centimeters
11. a rectangular box with dimensions
 $2\frac{1}{2}$ centimeters \times 2 centimeters \times 1 centimeter
12. a cubic box with side lengths $3\frac{2}{3}$ centimeters
13. a cubic box that holds 125 unit cubes
14. An open box is a box without a top.
- a. On grid paper, sketch nets for three different open cubic boxes.
 - b. On grid paper, sketch nets for three different open rectangular boxes (not cubic boxes) with square ends.
 - c. Find the area of each net you found in parts (a) and (b).



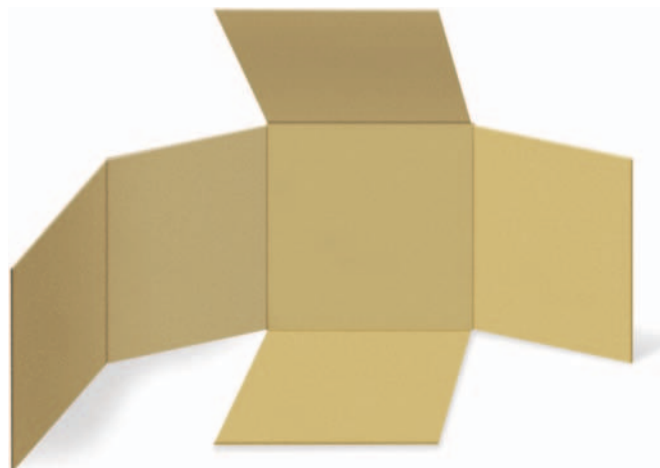
For: Help with Exercise 10
Web Code: ane-6110

Connections

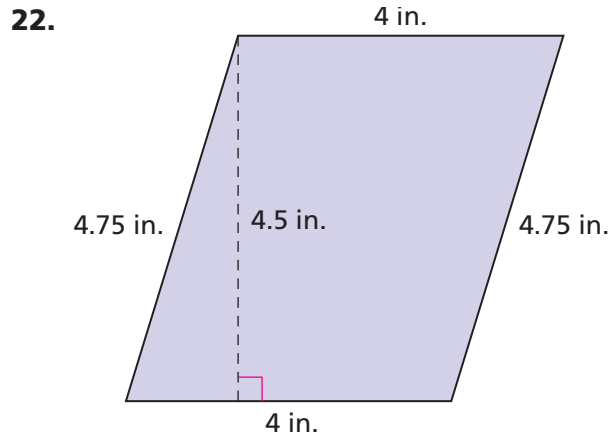
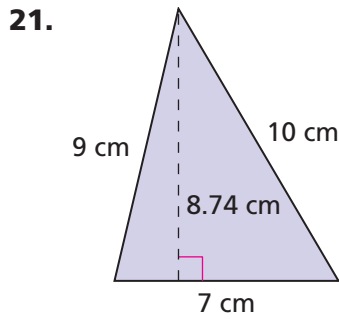
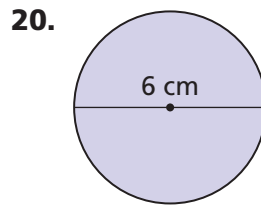
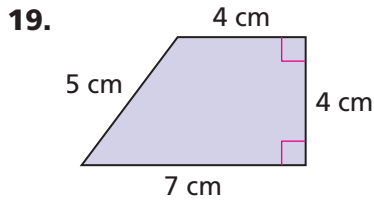
For Exercises 15–18, use the following information: A *hexomino* is a shape made of six identical squares connected along their sides. The nets for a closed cubic box are examples of hexominos. Below are five different hexominos.



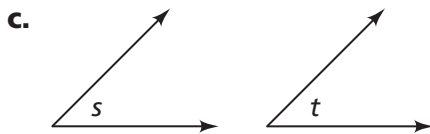
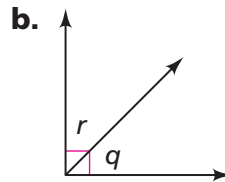
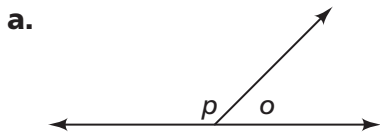
15. Find the perimeter of each hexomino shown above.
16. Which hexominos can you fold to form a closed cubic box?
17. From which hexominos can you remove one square to make a net for an open cubic box? For each hexomino you select, draw a diagram showing which square can be removed.
18. To which hexominos can you add the number of squares below without changing the perimeter? For each hexomino you select, draw a diagram. Explain why the perimeter does not change.
 - a. one square
 - b. two squares



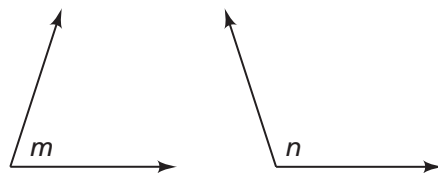
For Exercises 19–22, find the area and the perimeter of each figure. Figures are not drawn to scale.



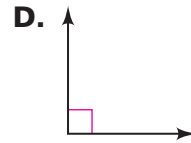
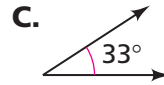
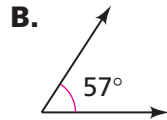
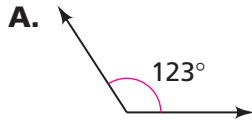
23. Which pair of angles are complementary angles?



24. Angles m and n below are supplementary angles. Angle m has a measure of 78° . What is the measure of angle n ?



25. Multiple Choice Which angle is supplementary to a 57° angle?



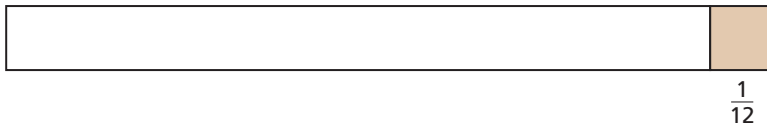
26. What measurements do you need and how do you use those measurements to find the area and perimeter of each figure below?

a. rectangle

b. square

27. Mrs. Zhou is making wooden slats for doll beds from a strip of thin board.

She cuts $\frac{1}{12}$ of the strip for another project. Bed slats for one doll bed take $\frac{1}{8}$ of a strip.



a. Suppose Mrs. Zhou uses the remainder of this strip for bed slats. How many doll beds can she make?

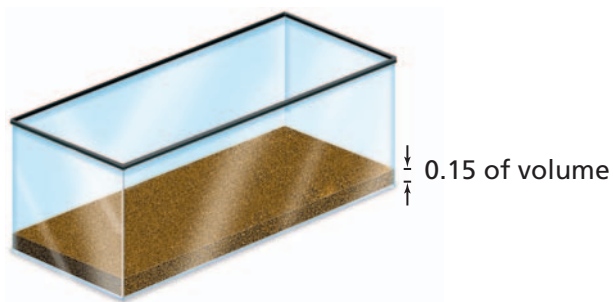
b. Draw diagrams to confirm your answer.



- 28. a.** Four friends shared $\frac{3}{5}$ of a pizza. What fraction of the pizza did each receive?
- b.** Draw a picture to confirm your answer.



- 29.** Mr. Bouck is making snack bars. The recipe calls for $\frac{3}{8}$ stick of butter. He has $3\frac{1}{2}$ sticks on hand.
- a.** How many recipes can he make?
- b.** Draw a picture to show your reasoning.
- 30.** Tom plans to plant an herb garden in a glass tank. A scoop of dirt fills 0.15 of the volume of the tank. He needs to put in dirt equal to 65% of the volume. How many scoops of dirt does he need?



- 31.** A glass container is 0.5 full of water. After 400 milliliters are poured out, the container is 0.34 full. How much does the container hold?



Extensions

- 32.** A number cube is designed so that numbers on opposite sides add to 7. Write the integers from 1 to 6 on one of the nets you found in Problem 1.1 so that it can be folded to form this number cube. You may want to test your pattern by cutting it out and folding it.
- 33.** Examine the nets you made for cubic boxes in Problem 1.1. Suppose you want to make boxes by tracing several copies of the same pattern onto a large sheet of cardboard and cutting them out.

Which pattern allows you to make the greatest number of boxes from a square sheet of cardboard with a side length of 10 units? Test your ideas on grid paper.