

Applications

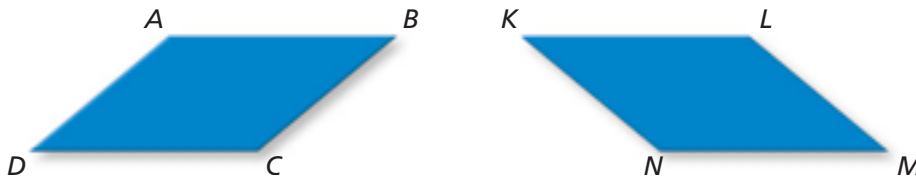
Match each side and angle of the first shape in Exercises 1–4 with its congruent partner in the second shape.

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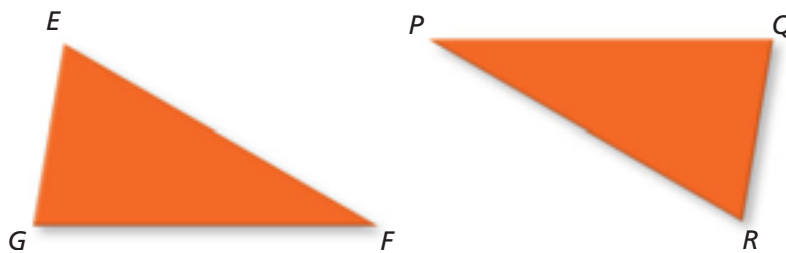
For: Multiple-Choice Skills
Practice

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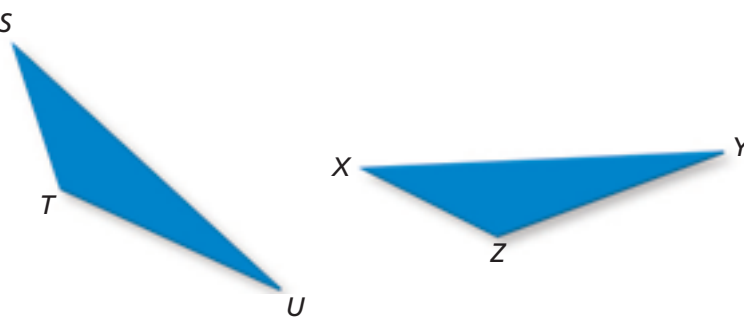
1.



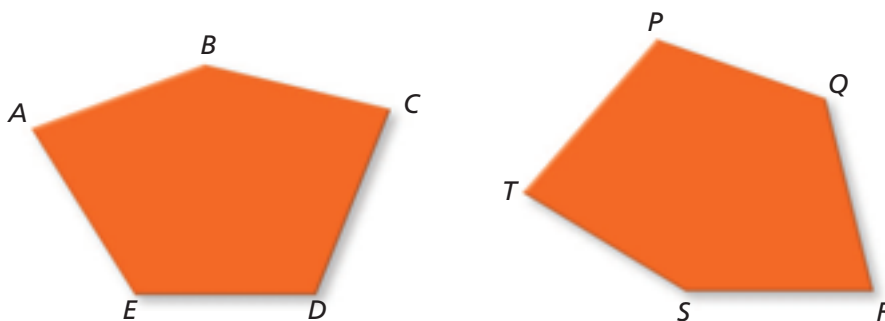
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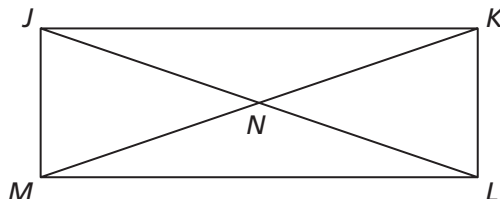
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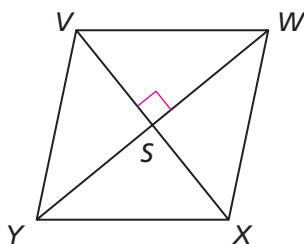
4.



- 5. a.** The figure below is a rectangle. Identify all the symmetries.
- b.** List all the sets of congruent triangles in this figure and give evidence for the congruence. Record your findings in a table with two columns. Label the columns “Sets of Congruent Triangles” and “Evidence for Congruence.”



- 6. a.** The figure below is a rhombus. Identify all the symmetries.

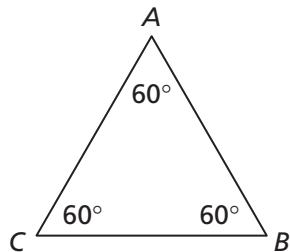


- b.** List all the sets of congruent triangles in the figure and give evidence for the congruence. Record your findings in a table like the one you made in Exercise 5.



In Exercises 7–10, you are given a triangle ABC and information about another triangle, DEF , which is shown below. Tell whether $\triangle DEF$ is *definitely congruent* to $\triangle ABC$, *possibly congruent* to $\triangle ABC$, or *definitely not congruent* to $\triangle ABC$.

7.

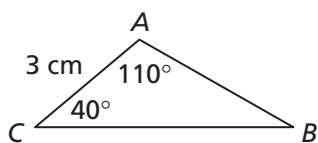


Angle D : 60°

Angle E : 60°

Angle F : 60°

8.

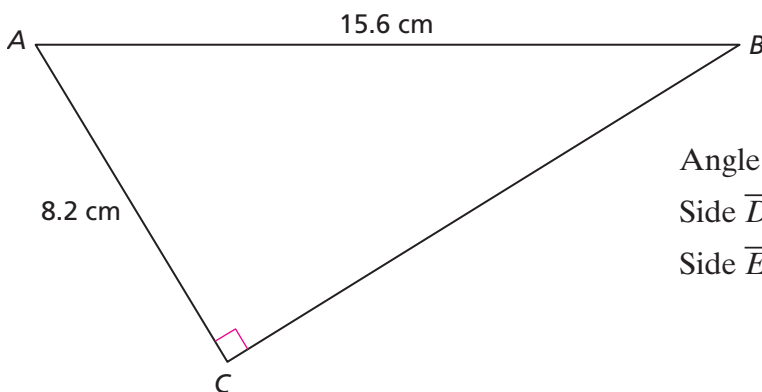


Angle D : 110°

Angle E : 40°

Side \overline{DF} : 3 cm

9.

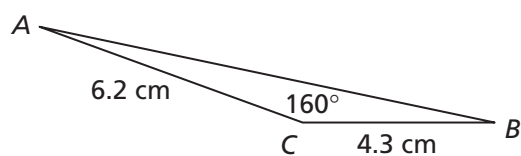


Angle F : 90°

Side \overline{DE} : 15.6 cm

Side \overline{EF} : 8.2 cm

10.



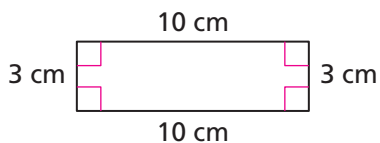
Angle F : 160°

Side \overline{DF} : 4.3 cm

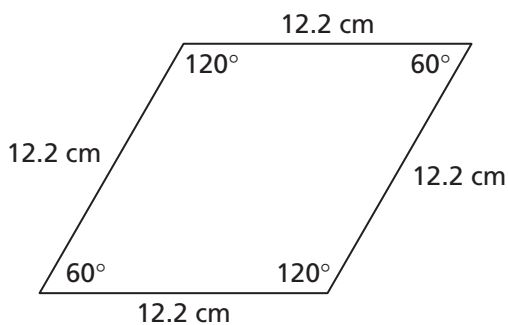
Side \overline{EF} : 6.2 cm

For Exercises 11–13, write a set of drawing directions for the given figure. Include the fewest measurements possible. Figures shown are not drawn to actual size.

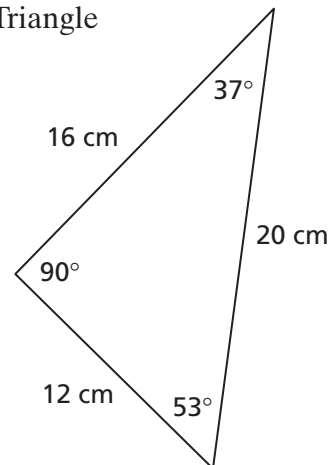
11. Quadrilateral



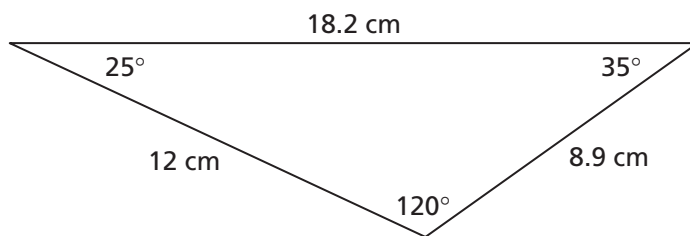
12. Quadrilateral



13. Triangle

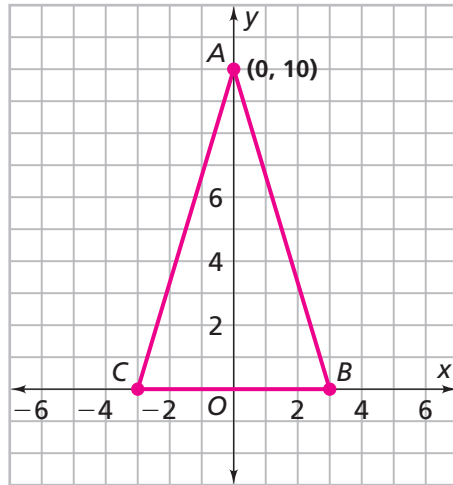


- 14. Multiple Choice** Which set of directions ensure that you will make a congruent copy of the triangle below?

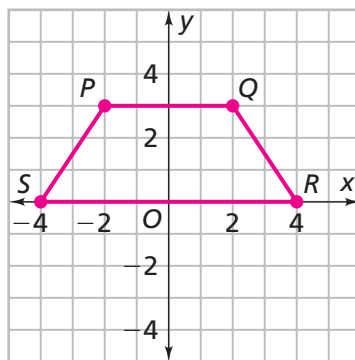


- A.** Draw a triangle with angle measures of 25° , 35° , and 120° .
B. Draw a triangle with one angle measuring 25° . Make a side next to that angle 12 cm long, and the side opposite that angle 8.9 cm long.
C. Make a triangle with side lengths of 8.9 cm and 12 cm.
D. Make a triangle with side lengths of 8.9 cm, 18.2 cm, and 12 cm.

15. a. Triangle ABC is shown below. Explain how you know that $\triangle AOC$ and $\triangle AOB$ are congruent.



- b. Use what you know about this figure to name equal lengths and congruent angles. Justify your statements.
16. a. Trapezoid $PQRS$ is shown below. Explain how you know that sides PS and QR are congruent.

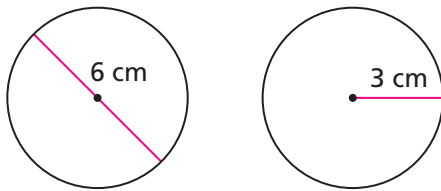


- b. Use what you know about symmetry and congruence to show that the two base angles are congruent.

Connections

Tell whether the circles in each are congruent. Explain.

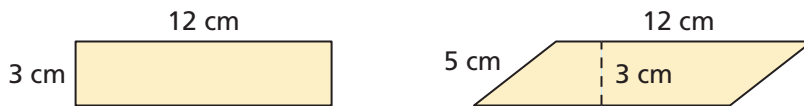
17.



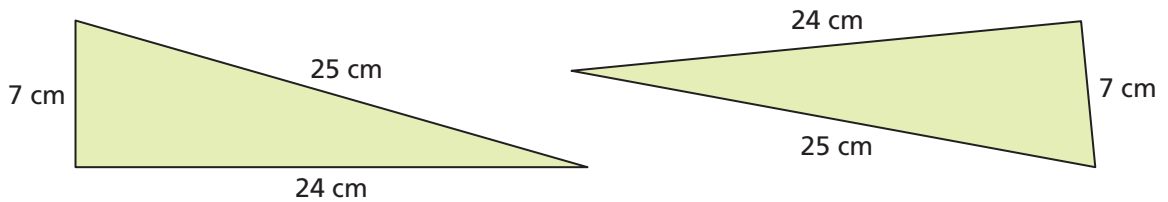
18. A circle with a radius of 4.2 cm and a circle with an area of 58.69 cm^2

For Exercises 19–21, find the perimeter and area of each figure. Then, tell whether the two figures are congruent.

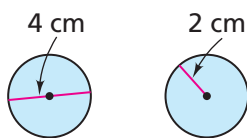
19.



20.



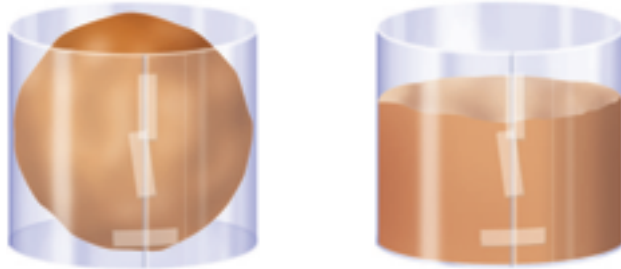
21.



22. If two shapes have equal perimeters, must the shapes be congruent? Give examples to support your answer.

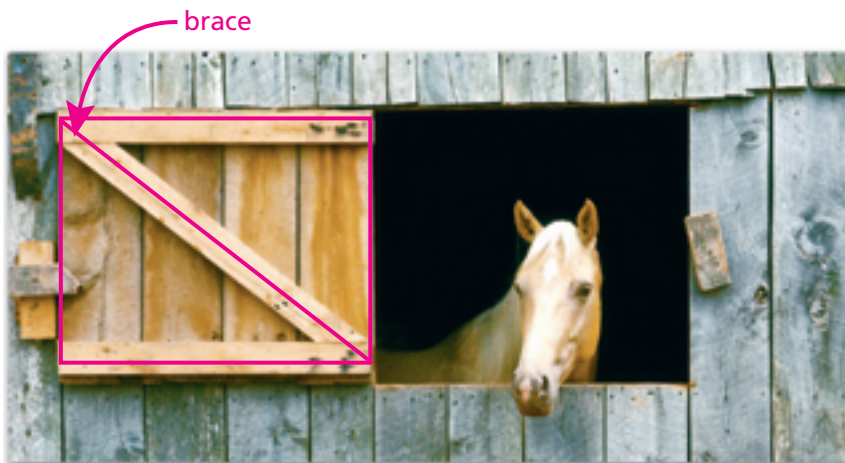
23. If two shapes have equal areas, must the shapes be congruent? Give examples to support your answer.

- 24. a.** What shape do you see if you slice through the center of a sphere and look at the new surface you created?
- b.** Donna made several cylinders. For each cylinder, she made clay spheres so that the sphere fit exactly inside the cylinder. She squished the clay down to see how much of the cylinder it filled. Every time it filled the cylinder up to $\frac{2}{3}$ of its height. How could this help her to find the volume of the sphere?

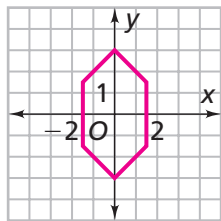


- c.** Use your ideas from part (b) to find the volume of a sphere that fits exactly inside a cylinder that is 11 inches high and has a base with radius 2.5 inches.
- d.** Give a formula for the volume of a sphere.
- 25.** In Problem 3.4, you discovered that knowing the side lengths of a triangle tells you exactly what its shape must be. You also found that the side lengths alone are not enough to tell you the shape of a quadrilateral.

How do these facts explain why braces are often used to help rectangular structures hold their shape?



26. a. Plot the points listed in the table on a coordinate grid, connecting them in order.
- b. What rule will transform figure $ABCDEF$ into the figure below?

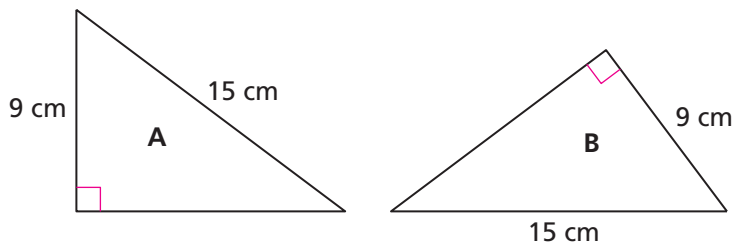


Point	Coordinates
A	(-1, -1)
B	(0, -2)
C	(1, -1)
D	(1, 1)
E	(0, 2)
F	(-1, 1)
A	(-1, -1)

- c. Is the figure above similar to figure $ABCDEF$?
- d. Apply the rule $(2x + 1, 2y)$ to figure $ABCDEF$. Is the image similar to figure $ABCDEF$? Explain.

Extensions

27. a. Use what you know about side-length relationships in right triangles to find the length of the third side of each triangle.



- b. Are the triangles congruent? Explain.
28. Can you say for certain that the triangles at the right are congruent?
29. In Exercise 28, you are given 2 pairs of corresponding congruent sides and a pair of corresponding congruent angles, opposite a pair of given sides.
- a. Is this the same arrangement of congruent sides and angles as in Exercise 27?
- b. Why can we determine the triangles are congruent in one case but not in the other?

