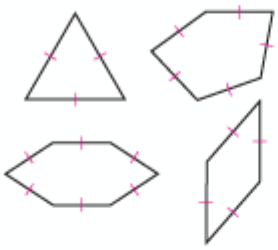
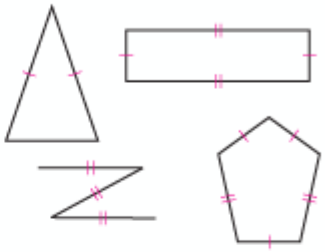
Investigation
Special Polygons

Write a good definition of each boldfaced term. Discuss your definitions with others in your group. Agree on a common set of definitions for your class and add them to your definitions list. In your notebook, draw and label a figure to illustrate each definition.

Equilateral Polygon

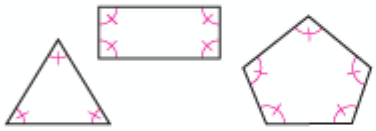


Equilateral polygons

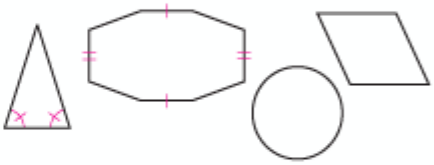


Not equilateral polygons

Equiangular Polygon

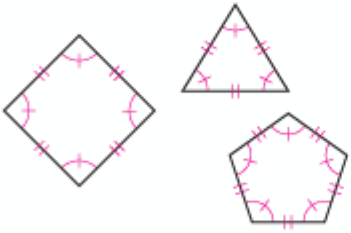


Equiangular polygons

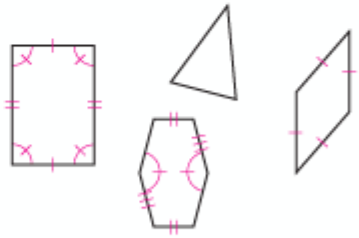


Not equiangular polygons

Regular Polygon



Regular polygons



Not regular polygons

EXERCISES

Practice Your Skills

For Exercises 1–3, draw an example of each polygon.

1. Quadrilateral **2.** Dodecagon **3.** Octagon

For Exercises 4–7, classify each polygon. Assume that all sides are straight.

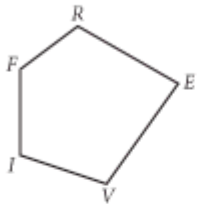
4. 

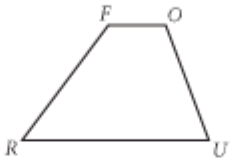
5. 

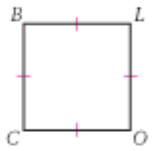
6. 

7. 

For Exercises 8–10, give one possible name for each polygon.

8. 

9. 

10. 

11. Write these definitions using the classify and differentiate method to fill in the blanks:

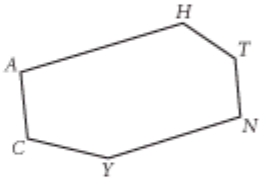
a. An octagon is _____ that _____.

b. A concave polygon is _____ that _____.

c. A 20-gon, also called an icosagon, is _____ that _____.

d. An equilateral polygon is _____ that _____.

12. Name a pair of consecutive angles and a pair of consecutive sides in the figure at right.

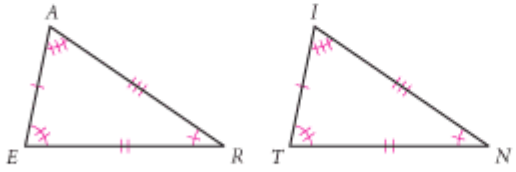


13. Draw a concave hexagon. How many diagonals does it have?

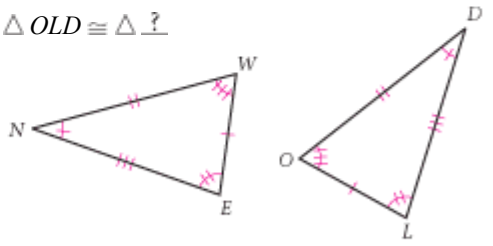
14. Name the diagonals of pentagon *ABCDE*.

For Exercises 15 and 16, use the information given to name the triangle that is congruent to the first one.

15. $\triangle EAR \cong \triangle \underline{?}$ (h)



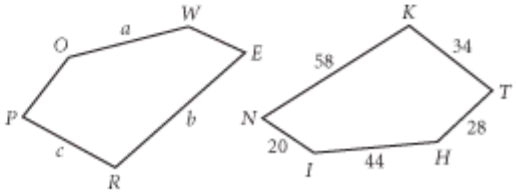
16. $\triangle OLD \cong \triangle \underline{?}$



17. In the figure at right, *THINK* $\cong$ *POWER*.

a. Find the measures *a, b,* and *c*.

b. If $m\angle P = 87°$ and $m\angle W = 165°$, which angles in *THINK* do you know? Write their measures.



18. If pentagon *FIVER* is congruent to pentagon *PANCH,* then which side in pentagon *FIVER* is congruent to side $\overline{PA}$? Which angle in pentagon *PANCH* is congruent to $\angle IVE$?

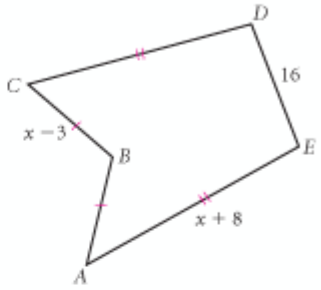
19. Use your geometry tools to draw a convex hexagon with two consecutive sides measuring 5 cm and three consecutive angles measuring 130°.

20. Draw an equilateral concave pentagon. Then draw an equiangular convex pentagon. (h)

21. Each side of a regular dodecagon measures 7 in. Find the perimeter.

22. The perimeter of an equilateral octagon is 42 cm. Find the length of each side.

23. The perimeter of *ABCDE* is 94 m. Find the lengths of segments *AB* and *CD*.

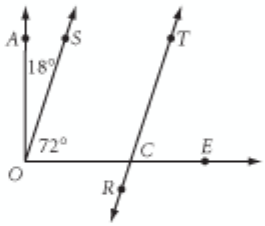


Review

24. Name a pair of complementary angles and a pair of vertical angles in the figure at right.

25. Draw $\overrightarrow{AB}$, $\overrightarrow{CD}$, and $\overrightarrow{EF}$ with $\overrightarrow{AB} \parallel \overrightarrow{CD}$ and $\overrightarrow{CD} \perp \overrightarrow{EF}$.

26. Draw a counterexample to show that this statement is false: "If a rectangle has perimeter 50 meters, then a pair of consecutive sides measures 10 meters and 15 meters."



27. Is it possible for four lines in a plane to have exactly zero points of intersection? One point? Two points? Three points? Four points? Five points? Six points? Draw a figure to support each of your answers. (h)

IMPROVING YOUR VISUAL THINKING SKILLS

Coin Swap II

Arrange three dimes and three pennies on a grid of seven squares, as shown. Follow the same rules as in Coin Swap I on page 46 to switch the position of the three dimes and three pennies in exactly 15 moves. Record your solution by listing in order which coin is moved. For example, your list might begin PDP. . . .