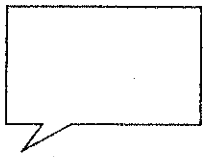
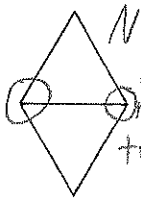
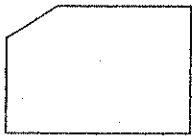
H. Geometry Sec. 1.6 Polygons Name Key

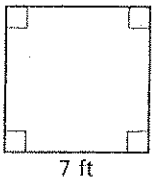
Tell whether the figure is a polygon. If it is not, *explain* why. If it is a polygon, tell whether it is *convex* or *concave*.

1. 
Yes, concave

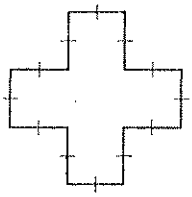
2. 
NO, segments intersect more than two segments

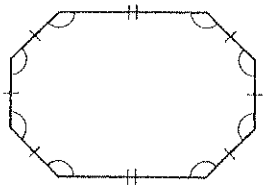
3. 
Yes, convex

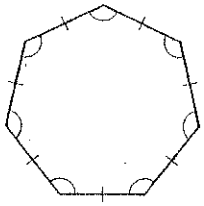
Classify the polygon by the number of sides. Tell whether the polygon is *equilateral*, *equiangular*, or *regular*. *Explain* your reasoning.

4. 

Quadrilateral regular

5. 
Dodecagon, equilateral

6. 
Octagon equiangular

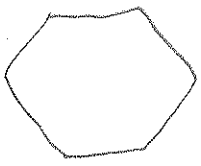
7. 
Heptagon regular

8. The lengths (in meters) of two sides of a regular heptagon are represented by the expressions $11x - 32$ and $6x - 7$. Find the length of a side of the heptagon. 23 m

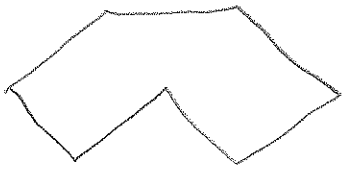
9. The expressions $-3x + 67$ and $7x - 18$ represent the lengths (in inches) of two sides of a regular nonagon. Find the length of a side of the nonagon. 41.5 in

Draw a figure that fits the description.

11. A convex hexagon



12. A concave heptagon



Tell whether the statement is *always*, *sometimes*, or *never* true.

15. A regular pentagon is concave. Never

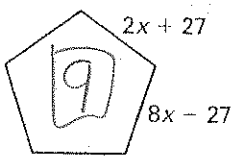
16. A square is a regular polygon. always

17. A dodecagon is convex. Sometimes

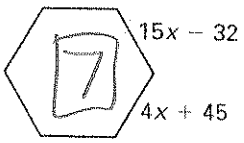
18. A triangle is equilateral but not equiangular. Never

Each figure is a regular polygon. Expressions are given for two side lengths. Find the value of x.

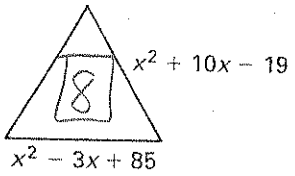
19.



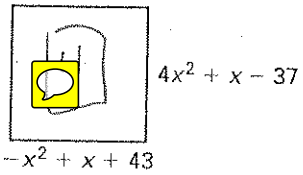
20.



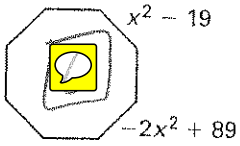
21.



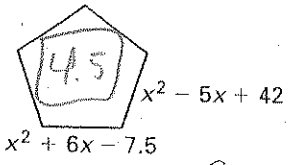
22.



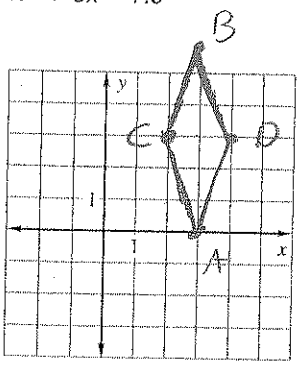
23.



24.



25. The vertices of a figure are given below. Plot and connect the points so that they form a convex polygon. Classify the figure. Then show that the figure is equilateral using algebra.



A(3,0) B(3,6) C(2,3) D(4,3)

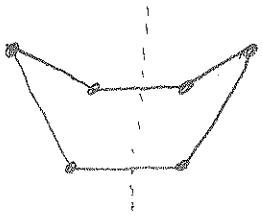
quadrilateral

$AC = \sqrt{10}$ $BD = \sqrt{10}$

$CB = \sqrt{10}$ $DA = \sqrt{10}$

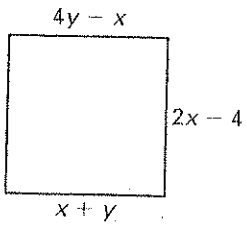
In Exercises 1–4, draw a figure with the indicated condition.

1. A hexagon with exactly one line of symmetry



In Exercises 7–9, the figure shown is a regular polygon. Find the values of x and y.

7.



$4y - x = x + y$ $x + y = 2x - 4$

$0 = 2x - 3y$ $4 = x - y$

$\begin{cases} 2x - 3y = 0 \\ (x - y = 4) \cdot -2 \end{cases}$

$2x - 3y = 0$

$-2x + 2y = -8$

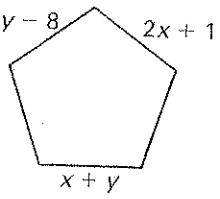
$-y = -8$

$y = 8$

$x - 8 = 4$

$x = 12$

8.



$3y - 8 = x + y$ $2x + 1 = x + y$

$-8 = x - 2y$ $x - y = -1$

$\begin{cases} x - 2y = -8 \\ (x - y = -1) \cdot -2 \end{cases}$

$x - 2y = -8$

$-2x + 2y = 2$

$-x = -6$

$x = 6$

$6 - y = -1$

$y = 7$