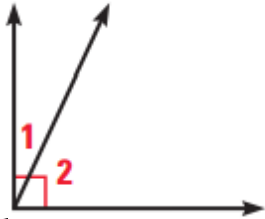
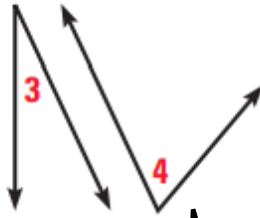


1.5 Angle Pair Relationships

- ❖ Complementary angles: two angles whose measures have sum of 90°

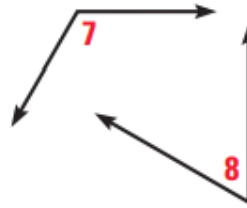
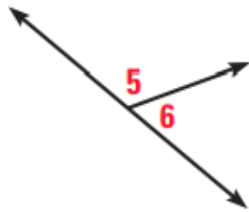


adjacent



nonadjacent

- ❖ Supplementary angles: two angles whose measures have sum of 180°



Example 3

Given that $\angle S$ and $\angle T$ are complementary and $m\angle S = 32^\circ$, find $m\angle T$.

$$\underline{m\angle T = 58^\circ}$$

$$\begin{array}{r} 90 \\ - 32 \\ \hline 58 \end{array}$$

Example 4

Given that $\angle U$ and $\angle V$ are supplementary and $m\angle U = 27^\circ$, find $m\angle V$.

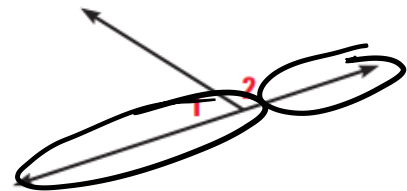
$$\underline{m\angle V = 153^\circ}$$

$$\begin{array}{r} 180 \\ - 27 \\ \hline 153 \end{array}$$

- ❖ Linear pair: two adjacent angles whose noncommon sides are

opposite rays

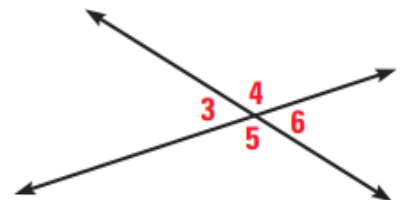
- The sum of the measures of angles that form a linear pair is 180°



- ❖ Vertical angles: two angles whose sides form two pairs of

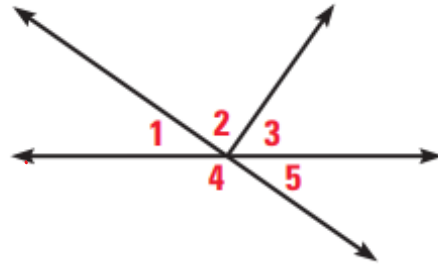
opposite rays

- Vertical angles are congruent



Example 1

- Are $\angle 1$ and $\angle 2$ a linear pair?
no
- Are $\angle 4$ and $\angle 5$ a linear pair?
yes
- Are $\angle 5$ and $\angle 3$ vertical angles?
no
- Are $\angle 1$ and $\angle 3$ vertical angles?
no



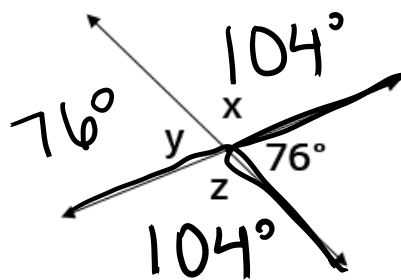
Example 2

Find the missing angles.

$\angle x =$

$\angle y =$

$\angle z =$



$$\begin{array}{r} 180 \\ - 76 \\ \hline 104 \end{array}$$

Example 3

Solve for x and y, then find the angle measures.

$$y + 20 + 4y - 15 = 180$$

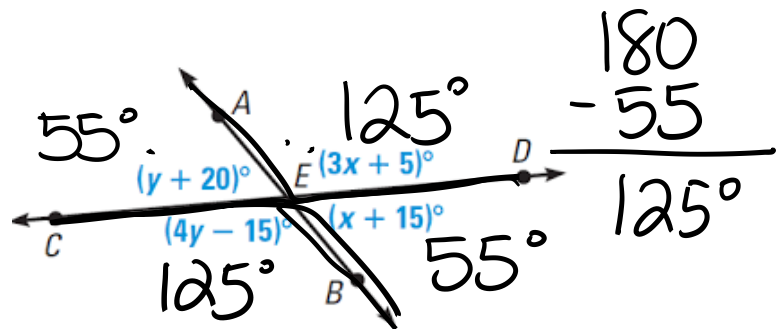
$$5y + 5 = 180$$

$$y = 35 \checkmark$$

$$35 + 20 = 55$$

$$x + 15 = 55$$

$$x = 40 \checkmark$$



$$\begin{array}{r} 180 \\ - 55 \\ \hline 125 \end{array}$$

Example 4

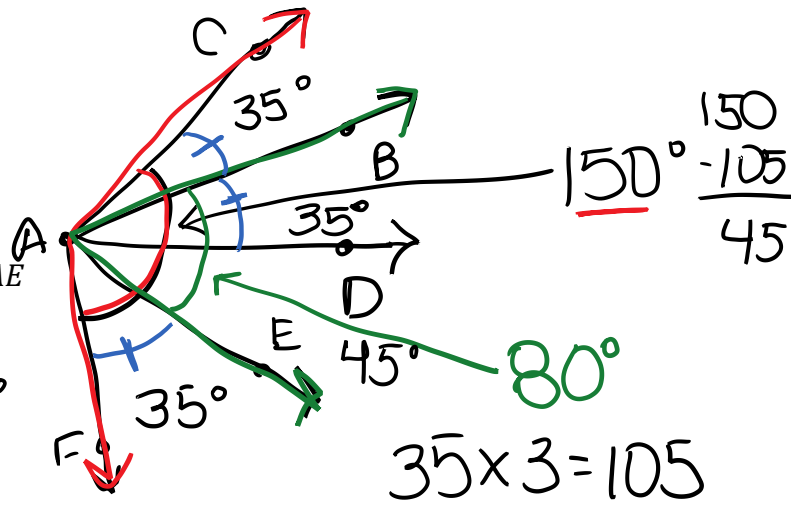
Use the following information then find the angle measures.

- B is in the interior of $\angle CAD$
- D is in the interior of $\angle BAE$
- E is in the interior of $\angle DAF$
- $m\angle CAF = 150^\circ$ and $m\angle BAE = 80^\circ$
- $m\angle CAB = m\angle BAD = m\angle EAF = 35^\circ$

Find: $m\angle CAB$, $m\angle BAF$, $m\angle DAF$, and $m\angle DAE$

$$\begin{array}{r} 150 \\ - 80 \\ \hline 70 \\ 2 = 35 \end{array}$$

\downarrow 35° \downarrow 115° \downarrow 80° \downarrow 45°

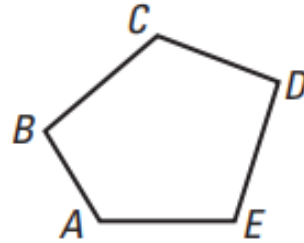


$$\begin{array}{r} 150 \\ - 105 \\ \hline 45 \end{array}$$

$$35 \times 3 = 105$$

1.6 Classify the Polygons

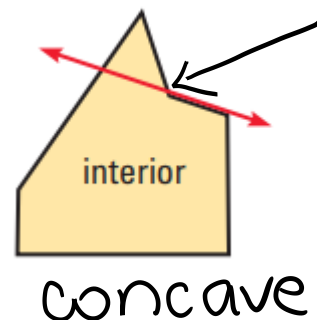
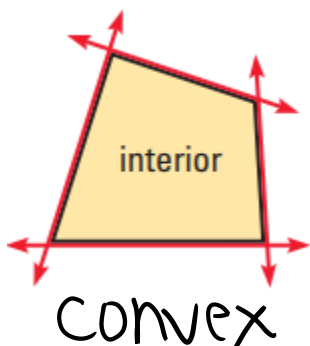
- ❖ Polygons are named by the # of sides they have.
 - Formed by three or more segments
- ❖ Each side intersects exactly two sides one at each endpoint
 - Each endpoint of a side is a vertex of the polygon.
- ❖ A polygon can be named by listing the vertices in consecutive order.



Number of Sides	Type of Polygon
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon
7	Heptagon

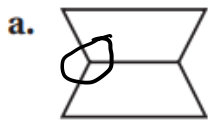
Number of Sides	Type of Polygon
8	Octagon
9	Nonagon
10	Decagon
12	Dodecagon
n	n-gon

- ❖ A polygon is Convex if no line that contains a side of the polygon contains a point in the interior of the polygon.
- ❖ A polygon that is not convex is called nonconvex or Concave

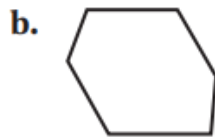


Example 1

Tell whether the figure is a polygon and whether it is *convex* or *concave*.



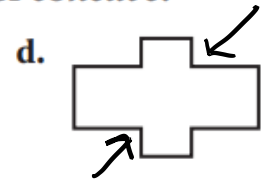
not a polygon



convex polygon



not a polygon

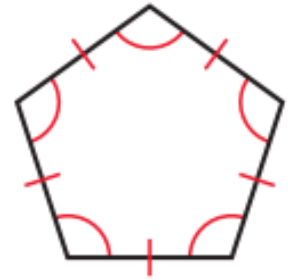


Concave polygon

❖ **Equilateral polygon:** all sides are congruent.

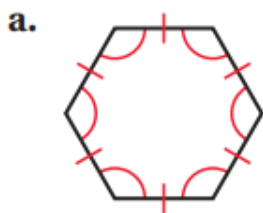
❖ **Equiangular polygon:** all angles in the interior of the polygon are congruent.

❖ **Regular polygon:** a **convex** polygon that is both equilateral and equiangular

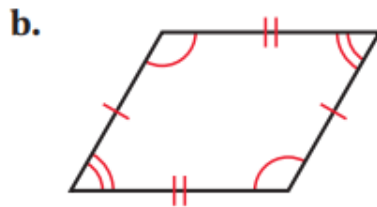


Example 2

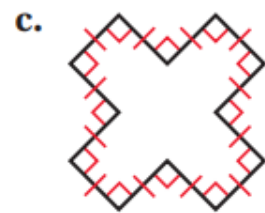
Classify the polygon by the number of sides. Tell whether the polygon is equilateral, equiangular, or regular. Explain your reasoning.



regular hexagon



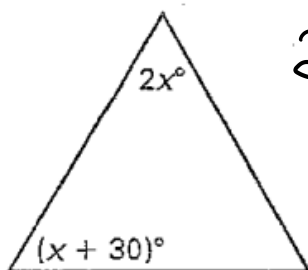
Quadrilateral



equilateral
equiangular
dodecagon

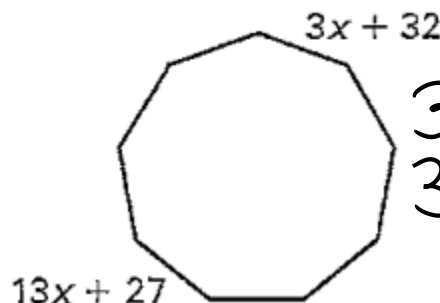
Example 3

Each figure is a **regular** polygon. Find the value of x .



$$2x = x + 30$$

$$x = 30$$



$$3x + 32 = 13x + 27$$

$$32 = 10x + 27$$

$$5 = 10x$$

$$\frac{1}{2} = x$$