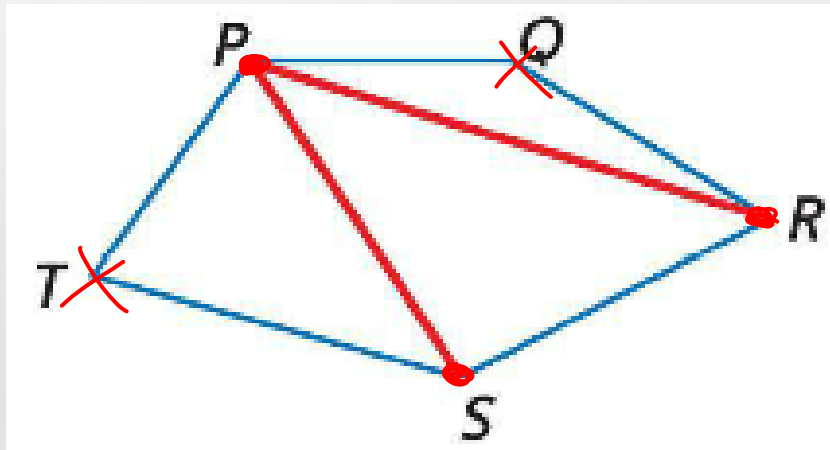


PROPERTIES OF POLYGONS



DIAGONAL

A DIAGONAL OF A POLYGON IS A SEGMENT THAT CONNECTS ANY TWO NONCONSECUTIVE VERTICES.



POLYGON INTERIOR ANGLES SUM

- **THE SUM OF THE ANGLE MEASURES OF A POLYGON IS THE SUM OF THE ANGLE MEASURES OF THE TRIANGLES FORMED BY DRAWING ALL THE POSSIBLE DIAGONALS FROM ONE VERTEX.**
- **THE SUM OF THE INTERIOR ANGLE MEASURES OF AN n -SIDED CONVEX POLYGON IS $(n-2) \cdot 180$**

EXAMPLES

- **FIND THE SUM OF THE MEASURES OF THE INTERIOR ANGLES OF A CONVEX OCTAGON.**

$$(N-2)180$$

$$(8-2)180$$

$$6 \cdot 180$$

$$1080$$

EXAMPLES

- **FIND THE SUM OF THE MEASURES OF THE INTERIOR ANGLES OF A CONVEX OCTAGON.**
- **OCTAGON = 8 SIDES**
- **$(8 - 2) * 180 = 6 * 180 = 1080$**

EXAMPLES

- **FIND THE SUM OF THE MEASURES OF THE INTERIOR ANGLES OF A CONVEX 32-GON.**

$$\begin{aligned} N &= 32 \\ (N-2)180 & \\ (32-2)180 & \\ 30 \cdot 180 & \end{aligned} \rightarrow 5400$$

EXAMPLES

- **FIND THE SUM OF THE MEASURES OF THE INTERIOR ANGLES OF A CONVEX 32-GON.**
- **32 SIDES**
- **$(32 - 2) * 180 = 30 * 180 = 5400$**

$$10x + 170 = 540$$

EXAMPLES

- FIND THE MEASURE OF EACH INTERIOR ANGLE OF PENTAGON *HJKLM*.

$$N=5 \quad (5-2)180$$
$$3 \cdot 180$$
$$540$$

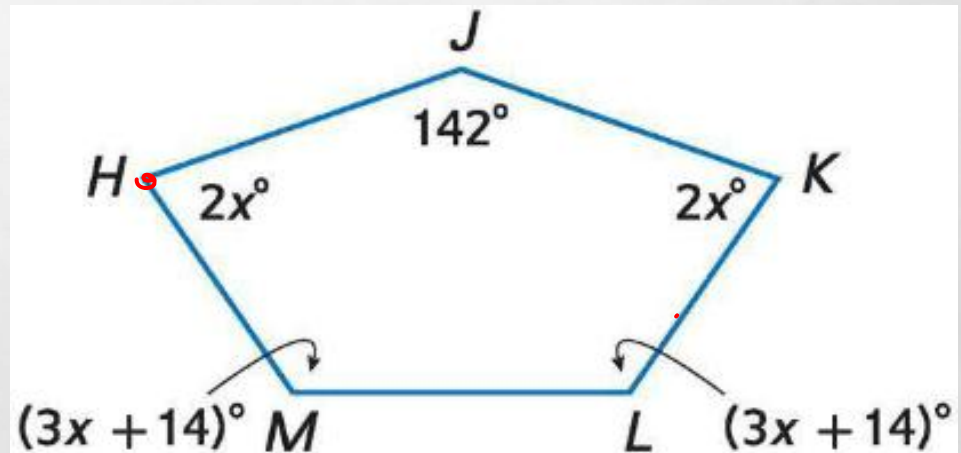
$$2x$$
$$142$$

$$2x$$

$$3x+14$$

$$3x+14$$

$$10x+170$$



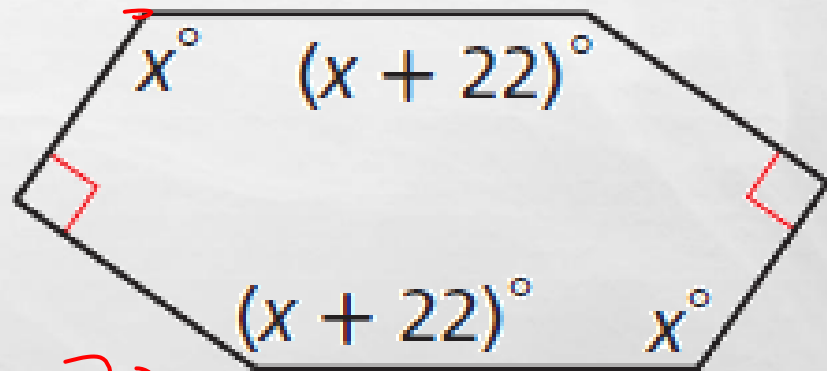
EXAMPLES

- **FIND THE MEASURE OF EACH INTERIOR ANGLE OF PENTAGON *HJKLM*.**
- **$(5 - 2) * 180 = 3 * 180 = 540$**
- **$2X + 2X + (3X + 14) + (3X + 14) + 142 = 540$**
- **$10X + 28 + 142 = 540$**
- **$10X = 370$**
- **$X = 37$**
- **74, 74, 125, 125, 142**

EXAMPLES

- FIND THE MEASURE OF EACH INTERIOR ANGLE OF ~~PENTAGON JKLM~~

$$\begin{array}{r} x \\ x + 22 \\ 90 \\ \hline \end{array}$$
$$(6-2)180$$
$$4 \cdot 180$$
$$720$$



$$4x + 224 = 720$$

$$\begin{array}{r} x \\ x + 22 \\ + \quad 90 \\ \hline 4x + 224 \end{array}$$

EXAMPLES

- **FIND THE MEASURE OF EACH INTERIOR ANGLE OF PENTAGON *HJKLM*.**
- **$(6 - 2) * 180 = 4 * 180 = 720$**
- **$X + X + (X + 22) + (X + 22) + 90 + 90 = 720$**
- **$4X + 224 = 720$**
- **$4X = 496$**
- **$X = 124$**
- **124, 124, 146, 146, 90, 90**

EXAMPLES

- **THE MEASURE OF AN INTERIOR ANGLE OF A REGULAR POLYGON IS 135. FIND THE NUMBER OF SIDES IN THE POLYGON.**

$$(N-2)180 = 135N$$

$$180N - 360 = 135N$$

$$180N - 135N = 360$$

$$\begin{array}{r} 45N = 360 \\ \underline{45} \quad \underline{8} \end{array}$$

$$N = 8$$

EXAMPLES

- **THE MEASURE OF AN INTERIOR ANGLE OF A REGULAR POLYGON IS 135. FIND THE NUMBER OF SIDES IN THE POLYGON.**

- **$135N = (N - 2) * 180$**

- **$135N = 180N - 360$**

- **$360 = 45N$**

- **$N = 8$**

EXAMPLES

- THE MEASURE OF AN INTERIOR ANGLE OF A REGULAR POLYGON IS 108. FIND THE NUMBER OF SIDES IN THE POLYGON.

$$\begin{aligned}(N-2)180 &= 108N \\ 180N - 360 &= 108N \\ \frac{72N}{72} &= \frac{360}{72} \\ N &= 5\end{aligned}$$

EXAMPLES

- **THE MEASURE OF AN INTERIOR ANGLE OF A REGULAR POLYGON IS 108. FIND THE NUMBER OF SIDES IN THE POLYGON.**

- **$108N = (N - 2) * 180$**

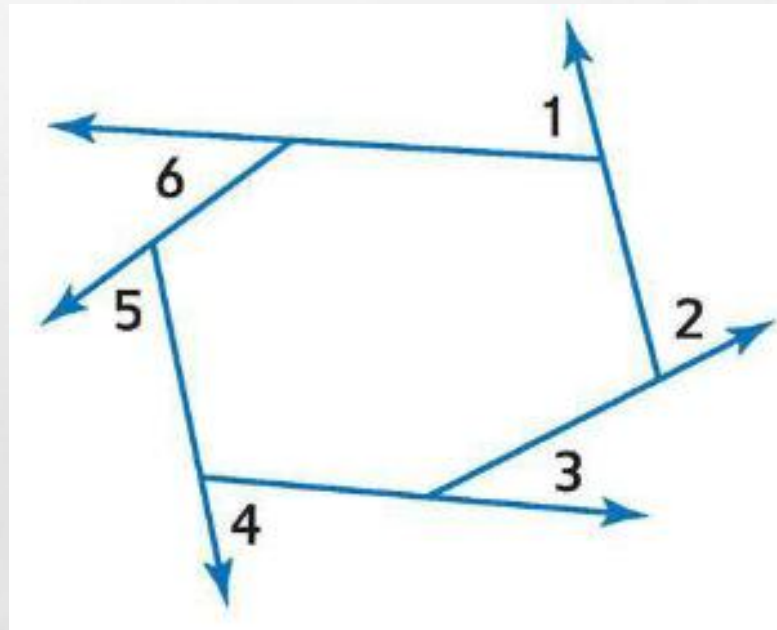
- **$108N = 180N - 360$**

- **$360 = 72N$**

- **$N = 5$**

POLYGON EXTERIOR ANGLE SUM

- **THE SUM OF THE EXTERIOR ANGLE MEASURES OF A CONVEX POLYGON IS 360.**



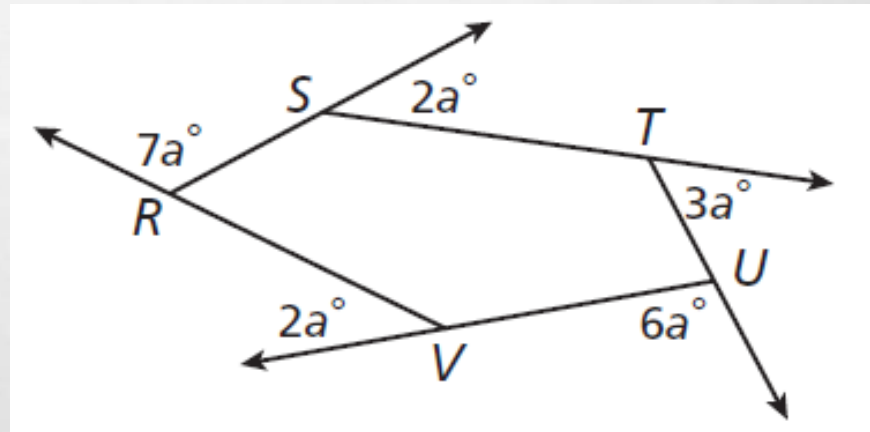
EXAMPLES

- FIND THE VALUE OF a IN POLYGON $RSTUV$.

$$\begin{array}{r} 7a \\ 2a \\ 3a \\ 6a \\ + 2a \\ \hline 20a \end{array}$$

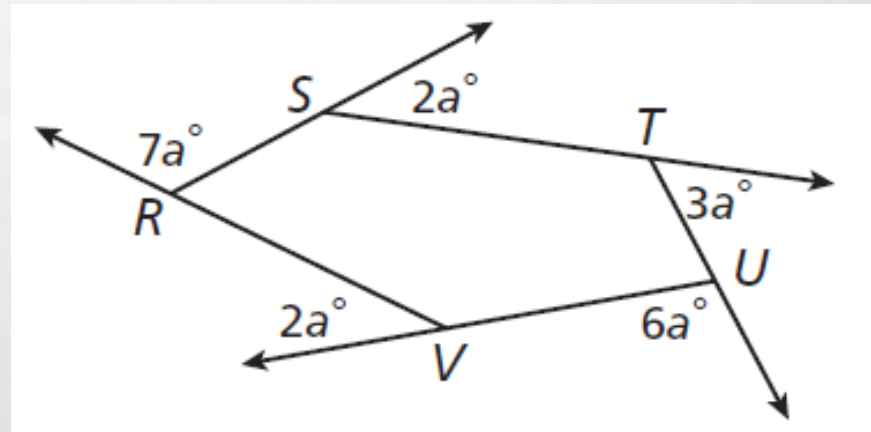
$$\frac{20a}{20} = \frac{360}{20}$$

$$a = 18$$



EXAMPLES

- FIND THE VALUE OF A IN POLYGON $RSTUV$.



- $7A + 2A + 3A + 6A + 2A = 360$
- $20A = 360$
- $A = 18$

EXAMPLES

- A PENTAGON HAS EXTERIOR ANGLE MEASURES OF $5A^\circ$, $4A^\circ$, $10A^\circ$, $3A^\circ$, AND $8A^\circ$. FIND THE VALUE OF A

$$\begin{array}{r} 5A \\ 4A \\ 10A \\ 3A \\ + 8A \\ \hline 30A \end{array}$$

$$\begin{array}{r} 30A = 360 \\ \hline 30 \end{array}$$

$$A = 12$$

EXAMPLES

- A PENTAGON HAS EXTERIOR ANGLE MEASURES OF $5A^\circ$, $4A^\circ$, $10A^\circ$, $3A^\circ$, AND $8A^\circ$. FIND THE VALUE OF A
- $5A + 4A + 10A + 3A + 8A = 360$
- $30A = 360$
- $A = 12$