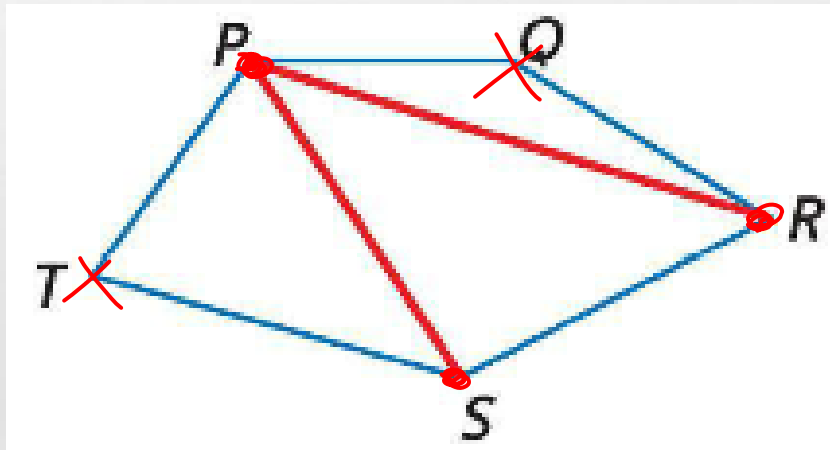


PROPERTIES OF POLYGONS



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.**

$$n = 8$$

$$(8 - 2)180$$

$$6 \cdot 180$$

$$1080$$

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.**

$$N = 32$$

$$(32 - 2)180$$

$$30 \cdot 180$$

$$5400$$

EXAMPLES

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

$$10x + 170 = 540$$

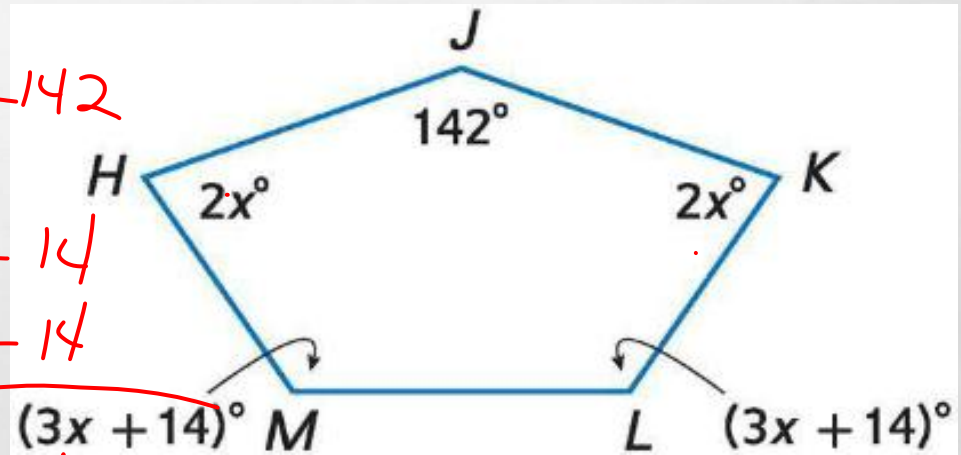
EXAMPLES

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

$$\begin{aligned} N &= 5 \\ (5-2)180 \\ 3 \cdot 180 \\ 540 \end{aligned}$$

$$\begin{aligned} 2x \\ +142 \\ 2x \\ 3x + 14 \\ 3x + 14 \end{aligned}$$

$$10x + 170$$



EXAMPLES

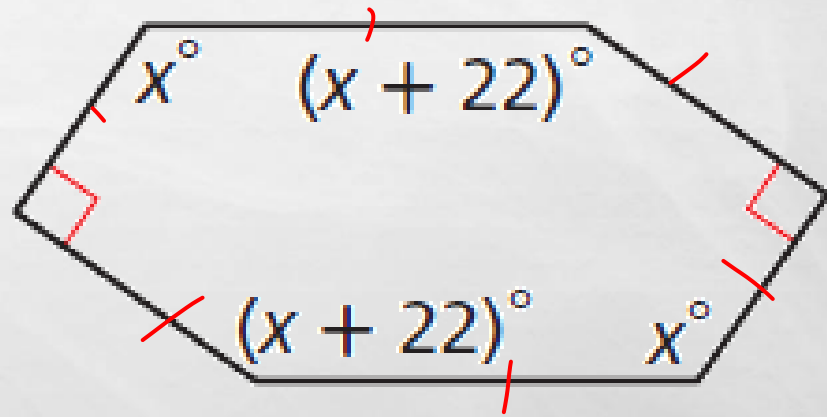
- **FIND THE MEASURE OF EACH INTERIOR ANGLE OF PENTAGON *HJKLM*.**
- **$(5 - 2) * 180 = 3 * 180 = 540$**
- **$2X + 2X + (3X + 14) + (3X + 14) + 142 = 540$**
- **$10X + 28 + 142 = 540$**
- **$10X = 370$**
- **$X = 37$**
- **74, 74, 125, 125, 142**

$$4x + 224 = 720$$

EXAMPLES

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

x	$N=6$
$x + 22$	$(6-2)180$
90	$4 \cdot 180$
x	720
$x + 22$	
90	
<hr/>	
$4x + 224$	



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.**

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

$$135N = 180N - 360$$

$$360 = 180N - 135N$$

$$\frac{360}{45} = \frac{45N}{45} \longrightarrow \boxed{8=N}$$

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.**

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

$$108N = 180N - 360$$

$$360 = 180N - 108N$$

$$\frac{360}{72} = \frac{72N}{72} \rightarrow \boxed{N=5}$$

EXAMPLES

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

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

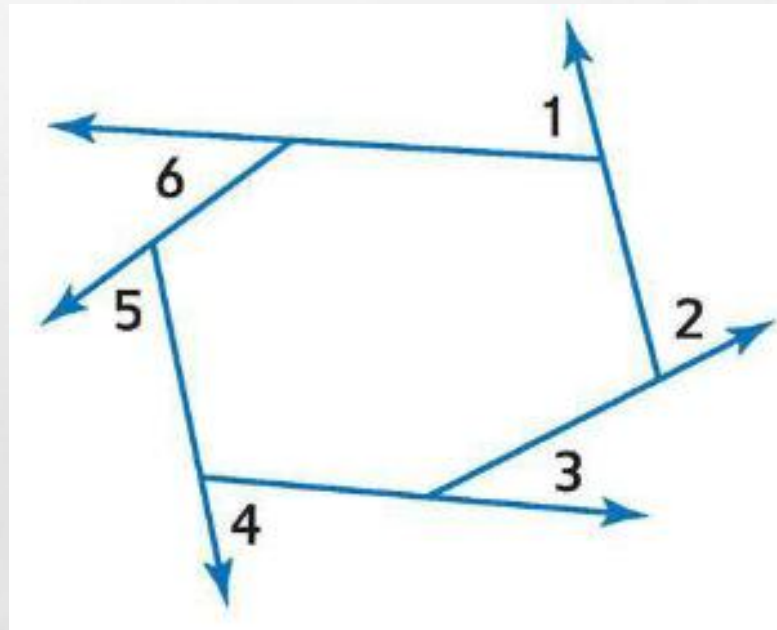
- **$108N = 180N - 360$**

- **$360 = 72N$**

- **$N = 5$**

POLYGON EXTERIOR ANGLE SUM

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

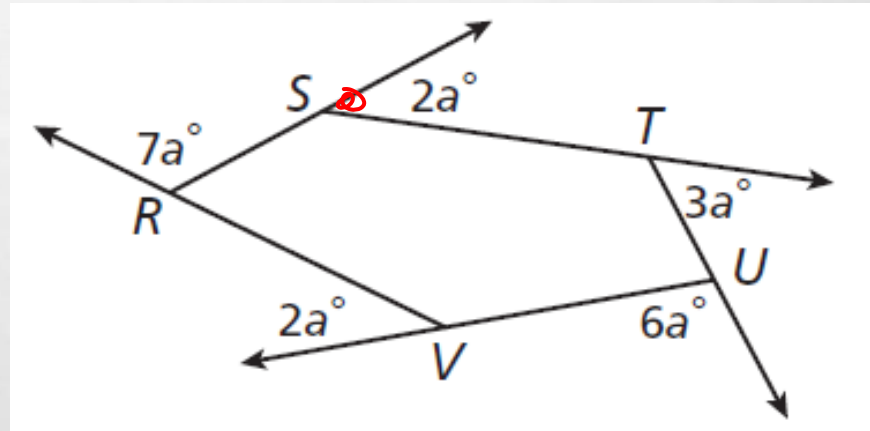


EXAMPLES

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

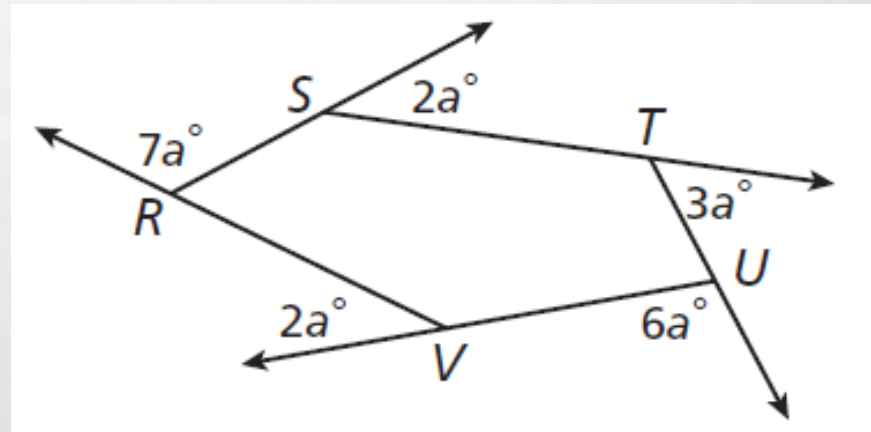
$$\begin{array}{r} 2a \\ 3a \\ 6a \\ 2a \\ + 7a \\ \hline 20a \end{array}$$

$$\frac{20a}{20} = \frac{360}{20}$$
$$a = 18$$



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

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

$$\begin{array}{r} \cancel{30A} = \cancel{360} \\ \hline 30 \quad 30 \\ A = 12 \end{array}$$

EXAMPLES

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