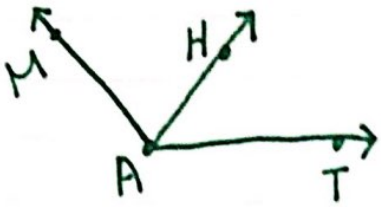
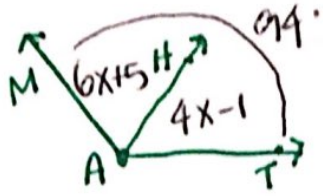
Angle Addition Postulate: $m\angle MAH + m\angle HAT = m\angle MAT$

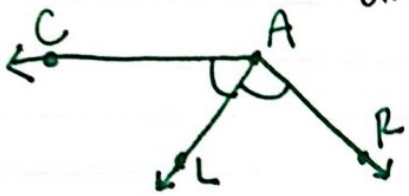


Ex. $m\angle MAH$ is $6x+5$, $m\angle HAT$ is $4x-1$, find x if $m\angle MAT$ is $94°$.



$$6x+5+4x-1=94$$
$$10x+4=94$$
$$-4 \quad -4$$
$$\frac{10x}{10}=\frac{90}{10}$$
$$\boxed{x=9}$$

Angle Bisector Postulate: an angle bisector is a ray that divides an angle in half.

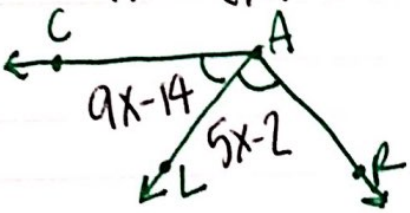


$\overrightarrow{AL}$ bisects $\angle CAR$

so

$m\angle CAL \cong m\angle LAR$

Ex. $m\angle CAL$ is $9x-14$, $m\angle LAR$ is $5x-2$, find x AND $m\angle CAR$.

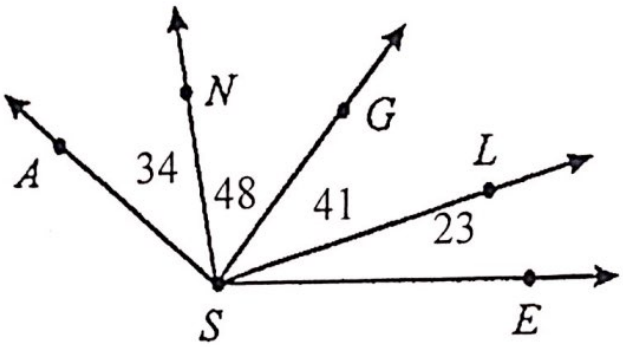


$$9x-14=5x-2$$
$$-5x \quad -5x$$
$$4x-14=-2$$
$$+14 \quad +14$$
$$\frac{4x}{4}=\frac{12}{4}$$

$\boxed{x=3}$

$$m\angle CAR=9(3)-14+5(3)-2$$
$$=27-14+15-2$$
$$=13+15-2$$
$$=28-2=\boxed{26}$$

Naming the Angle



Complete each equation with the correct angle name.

1) $m\angle ASN + m\angle NSG =$ m∠ASG

2) $m\angle NSG + m\angle LSG =$ m∠NSL

3) $m\angle ESL + m\angle GSL =$ m∠ESG

4) $m\angle ASG + m\angle GSE =$ m∠ASE

5) $m\angle ASN + m\angle NSL =$ m∠ASL

6) $m\angle ESN + m\angle NSA =$ m∠ASE

7) $m\angle NSL + m\angle LSE =$ m∠NSE

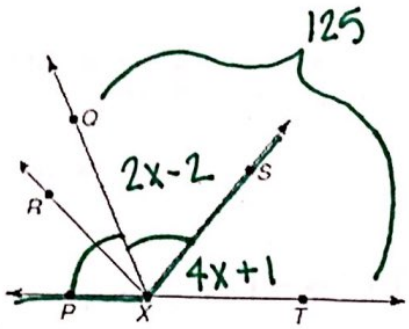
8) $m\angle ESL + m\angle LSG + m\angle GSN =$ m∠NSE

9) $m\angle ASN + m\angle NSL + m\angle LSE =$ m∠ASE

10) $m\angle GSL + m\angle LSE + m\angle GSN + m\angle NSA =$ m∠ESA

Angle Bisector Practice

In the figure, $\overrightarrow{XP}$ and $\overrightarrow{XT}$ are opposite rays and $\overrightarrow{XQ}$ bisects $\angle PXS$. For each situation, find the value of x and the measure of the indicated angle.



8. $m\angle SXT = 4x + 1$, $m\angle QXS = 2x - 2$, $m\angle QXT = 125$; $m\angle QXS$

$2x - 2 + 4x + 1 = 125$

$6x - 1 = 125$

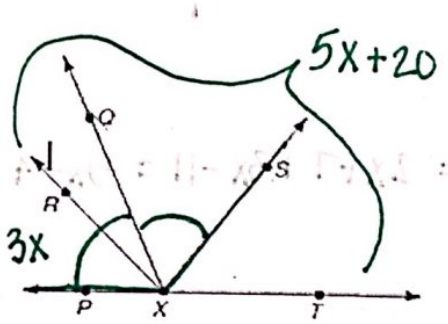
$+1 \quad +1$

$\frac{6x = 126}{6}$

$\boxed{x = 21}$

$m\angle QXS = 2(21) - 2 = 42 - 2 = \boxed{40^\circ}$

In the figure, $\overrightarrow{XP}$ and $\overrightarrow{XT}$ are opposite rays and $\overrightarrow{XQ}$ bisects $\angle PXS$. For each situation, find the value of x and the measure of the indicated angle.



9. $m\angle PXR = 3x$, $m\angle RXT = 5x + 20$, $m\angle RXT$

$3x + 5x + 20 = 180$

$8x + 20 = 180$

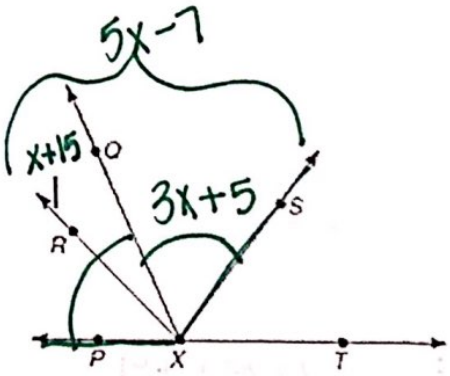
$-20 \quad -20$

$8x = 160$

$\boxed{x = 20}$

$m\angle RXT = 5(20) + 20 = \boxed{120^\circ}$

In the figure, $\overrightarrow{XP}$ and $\overrightarrow{XT}$ are opposite rays and $\overrightarrow{XQ}$ bisects $\angle PXS$. For each situation, find the value of x and the measure of the indicated angle.



10. $m\angle RXQ = x + 15$, $m\angle RXS = 5x - 7$, $m\angle QXS = 3x + 5$; $m\angle RXS$

$x + 15 + 3x + 5 = 5x - 7$

$4x + 20 = 5x - 7$

$+7 \quad +7$

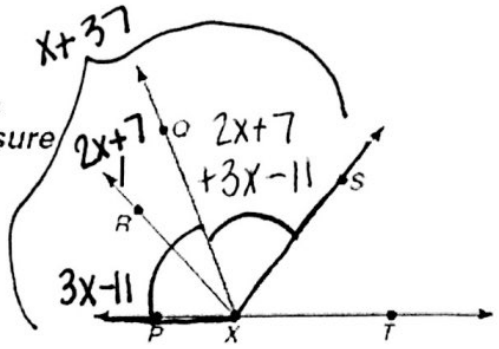
$4x + 27 = 5x$

$-4x \quad -4x$

$\boxed{27 = x}$

$m\angle RXS = 5(27) - 7 = \boxed{128^\circ}$

In the figure, $\overrightarrow{XP}$ and $\overrightarrow{XT}$ are opposite rays and $\overrightarrow{XQ}$ bisects $\angle PXS$. For each situation, find the value of x and the measure of the indicated angle.



11. $m\angle RXQ = 2x + 7$, $m\angle RXP = 3x - 11$, $m\angle PXS = x + 37$; $m\angle QXS$

$2x+7+3x-11+2x+7+3x-11 = x+37$

$10x - 8 = x + 37$

$-x \qquad -x$

$9x - 8 = 37$

$+8 \qquad +8$

$\frac{9x}{9} = \frac{45}{9}$

$\boxed{x = 5}$

$3x-11+2x+7 = \frac{x+37}{2}$

$2(5x-4) = \frac{x+37}{\cancel{2}} \cdot \cancel{2}$

$10x-8 = x+37$

$+8 \qquad +8$

$10x = x + 45$

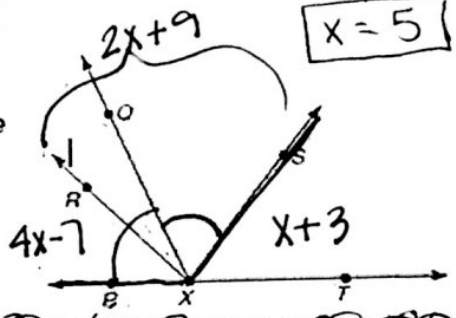
$-x \quad -x$

$\frac{9x}{9} = \frac{45}{9}$

$\boxed{x = 5}$

$m\angle QXS = 2x+7+3x-11 = 5x-4 = 5(5)-4 = \boxed{21°}$

In the figure, $\overrightarrow{XP}$ and $\overrightarrow{XT}$ are opposite rays and $\overrightarrow{XQ}$ bisects $\angle PXS$. For each situation, find the value of x and the measure of the indicated angle.



12. $m\angle TXS = x + 3$, $m\angle SXR = 2x + 9$, $m\angle RXP = 4x - 7$; $m\angle PXS$

$4x-7+2x+9+x+3 = 180$

$7x + 5 = 180$

$-5 \qquad -5$

$\frac{7x}{7} = \frac{175}{7}$

$\boxed{x = 25}$

$m\angle PXS =$ $2(25)+9$ $50+9$ 59

$25+3$ 28

$180-59-28 = 93$ $93-59 = 34$

$4(25)-7$ 93

$m\angle PXS = 93+59 = \boxed{152°}$