19) \( m\angle ZHG = 11x - 1 \), \( m\angle IHZ = 24^\circ \), and \( m\angle IHG = 12x + 13 \). Find \( m\angle IHG \).

\[ m\angle GHI = m\angle GHI + m\angle ZHI \]
\[ 12x + 13 = 11x - 1 + 24 \]
\[ 12x + 13 = 11x + 23 \]
\[ x + 13 = 23 \]
\[ x = 10 \]
\[ m\angle IHG = 12(10) + 13 \]
\[ = 133 \]

20) \( m\angle GFN = 4x + 10 \), \( m\angle NFE = 14x + 3 \), and \( m\angle GFE = 157^\circ \). Find \( m\angle NFE \).

\[ m\angle EFG = m\angle EFN + m\angle NFG \]
\[ 157 = 14x + 3 + 4x + 10 \]
\[ 157 = 18x + 13 \]
\[ 144 = 18x \]
\[ x = 8 \]
\[ m\angle NFE = 14x + 3 \]
\[ = 14(8) + 3 \]
\[ = 115 \]
A lighting designer is finalizing the lighting plan for an upcoming production. The spotlight can rotate 25° to the left or right from the center. The beam of light from the spotlight forms a 22° angle. Can the designer use the spotlight to light each of the objects on the stage?

\[
\begin{align*}
\text{Chair:} & \quad \theta + 22 = 57 \\
& \quad \theta = 35 \\
\end{align*}
\]

\[
\begin{align*}
\text{Table:} & \quad \gamma + 57 = 74 \\
& \quad \gamma = 17
\end{align*}
\]
Congruent Segments and Congruent Angles

Segments that have the same length are congruent segments.

\[ \overline{AB} \cong \overline{CD} \]
\[ \overline{PQ} \cong \overline{RS} \]

The same number of tick marks shows congruent segments.

Angles that have the same measure are congruent angles.

\[ \angle TUV \cong \angle XYZ \]
\[ \angle FGH \cong \angle JKL \]

The same number of arc marks shows congruent angles.
A. If $m \angle XWZ = 127$, what is $m \angle YWV$?

SOLUTION

$$m \angle XYW + m \angle YWU + m \angle UWZ = m \angle XWZ$$

$$32 + ? + 32 = 127$$

$$\angle Y + X = 127$$

$$X = 63$$
B. What is HF?

SOLUTION
6. a. If $m\angle NOP = 31$ and $m\angle NOQ = 114$, what is $m\angle ROQ$?

$x + x + 31 = 114$

$2x + 31 = 114$