

Lesson 3-3

Example 1

Use the figure below. Find the midpoint of \overline{MZ} .



Solution

The coordinate of point M is -3 . The coordinate of point Z is 3 . By the ruler postulate, $MZ = |-3 - 3| = |-6| = 6$.

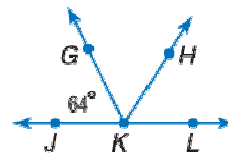
Since $\frac{1}{2}(6) = 3$, the midpoint of \overline{MZ} is 3 units to the right of point M .

The coordinate of this point would be $-3 + 3 = 0$.

So the midpoint of \overline{MZ} is A .

Example 2

ENGINEERING The figure shows a portion of the plans for adding angular supports to a bridge. In the figure, $\angle JKL$ is a straight angle, and \overline{KH} bisects $\angle GKL$. Find $m\angle HKL$.



Solution

Since $\angle JKL$ is a straight angle, $m\angle JKL = 180^\circ$.

By the angle addition postulate, $m\angle JKG + m\angle GKL = 180^\circ$.

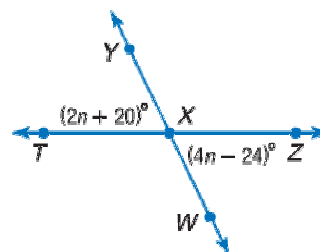
From the figure, $m\angle JKG = 64^\circ$

So, $64^\circ + m\angle GKL = 180^\circ$, and $m\angle GKL = 180^\circ - 64^\circ = 116^\circ$.

Since \overline{KH} bisects $\angle GKL$, $m\angle HKL = \frac{1}{2}m\angle GKL = \frac{1}{2}(116^\circ) = 58^\circ$.

Example 3

In the figure at the right, \overline{ZT} and \overline{YW} intersect at point X . Find $m\angle ZXW$.

**Solution**

Since $\angle ZXW$ and $\angle YXT$ are a pair of vertical angles, they are equal in measure. Use this fact to write and solve an equation.

$$m\angle ZXW = m\angle YXT$$

$$4n - 24 = 2n + 20$$

$$2n - 24 = 20$$

$$2n = 44$$

$$n = 22$$

Subtract $2n$ from each side.

Add 24 to each side.

Divide each side by 2.

So, the value of n is 22. From the figure, $m\angle ZXW = (4n - 24)^\circ$.
Substituting 22 for n , $m\angle ZXW = (4 \cdot 22 - 24)^\circ = (88 - 24)^\circ = 64^\circ$.