For 1 – 2: Use the figure above to answer the questions

1. Where would the point that bisects \( AB \) lie? Label this point \( M \).

2. Write the congruency statement to indicate what segments are congruent.

For 3 – 6: Solve for the variable and the indicated lengths.

3. \( B \) is the midpoint of \( AC \)

   \[ x = 15 \]
   \[ AB = 35 \]
   \[ AC = 70 \]

4. Point \( D \) bisects \( XZ \)

   \[ y = 21 \]
   \[ XD = 58 \]
   \[ DZ = 58 \]

5. \( WL = 54 \)

   \[ 4m + 3 = 54 \]
   \[ 4m + 3 + 4m + 3 = 54 \]
   \[ 8m + 6 = 54 \]
   \[ 8m = 48 \]
   \[ m = 6 \]
   \[ WT = 27 \]
   \[ TL = 27 \]

6. \( BN \) bisects \( ZV \)

   \[ 5x + 1 = 21 \]
   \[ 5x = 20 \]
   \[ x = 4 \]

   \[ x = 4 \]
   \[ ZC = 21 \]
   \[ CN = 12 \]
7. Determine if $H$ is the midpoint of $\overline{AQ}$ if you know $AQ = 6x - 7$

Circle One: $H$ is the midpoint $\boxed{H \text{ is NOT the midpoint}}$

Reasoning: Using the segment addition postulate, I found that $x = 8$. However, if $x = 8$ then $AH \neq HQ$.

8. Calvin’s home is located at the midpoint between Fast Pizza and Pizza Now. Fast Pizza is a quarter mile away from Calvin’s home. How far away is Pizza Now from Calvin’s home? How far apart are the two pizzerias?

Distance from Pizza Now to Calvin’s Home: \(\frac{1}{4}\text{ mile}\)

Distance between the two pizzerias: \(\frac{1}{2}\text{ mile}\)

9. The following solution is incorrect. What is wrong with the solution? How could you fix it?

Wrong solution: $3x = 30$

$x = 10$

Why is this solution wrong? This is wrong because you need to add both smaller segments to equal 30. Since the smaller segments are congruent, we could call them both $3x$. Therefore $3x + 3x = 30$.

$6x = 30$

$x = 5$
Use the midpoint formula \( M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \)

**For 10 – 11: Find the midpoint of each set of points**

10. \((2, -5)\) and \((6, -3)\)

\[
\left( \frac{2 + 6}{2}, \frac{-5 + (-3)}{2} \right) \quad \rightarrow \quad (4, -4)
\]

11. \((-7, -3)\) and \((17, 9)\)

\[
\left( \frac{-7 + 17}{2}, \frac{-3 + 9}{2} \right) \quad \rightarrow \quad (5, 3)
\]

**For 12-13: Given an endpoint A and midpoint M, find the other endpoint C.**

12. \(A = (7, -8)\) and \(M = (2, -3)\)

\[
2 \cdot \frac{7 + x}{2} = 2 \cdot 2 \\
x = 3
\]

\[
\left( -3, 2 \right)
\]

13. \(A = (3, 5)\) and \(M = (9, 6)\)

\[
2 \cdot \frac{3 + x}{2} = 9 \cdot 2 \\
x = 16
\]

\[
\left( 5, 3 \right)
\]

**For 14 – 15: Use the picture to the right to answer the questions.**

14. Find the point halfway from point D and point S.

\[
\left( \frac{-2 + 4}{2}, \frac{-4 + 4}{2} \right) \rightarrow \quad (1, 0)
\]

15. Find the point three-fourths of the way from point D to point S.

\[
\text{midpoint } (1, 0) \text{ and } (4, 4) \\
\left( \frac{1 + 4}{2}, \frac{0 + 4}{2} \right) \rightarrow \quad (2.5, 2)
\]