

Points, Segments and Angles: Core Definitions

Grade 10 – Geometry math · Test Answer Key · Standards: G-CO.A.1

Each answer shows the full reasoning that earns the points. Use the scoring notes to see how partial credit is awarded for the equation, the value of the variable and each requested measure.

Standards: G-CO.A.1 · **Level:** Grade 10 Geometry

Question 1 Reasoning with definitions (2 points)

- Always: if one angle is 90° , its linear-pair neighbors are 90° and its vertical angle is 90° .
- Sometimes: the complement of 20° is 70° (larger), but the complement of 70° is 20° (smaller).

(a) always, (b) sometimes

Scoring: 1 point for each correct answer with a valid reason.

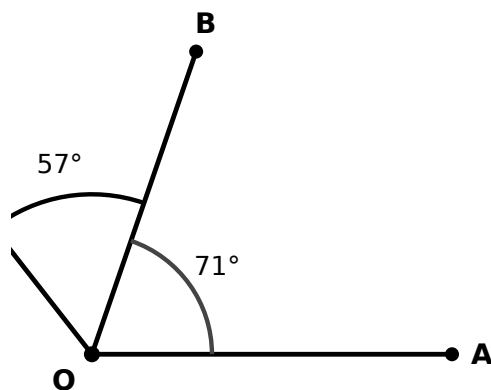
Question 2 Segment addition (3 points)

- $(4x - 3) + (2x + 9) = 48$, so $6x + 6 = 48$ and $x = 7$.
- $PQ = 4(7) - 3 = 25$ and $QR = 2(7) + 9 = 23$. Check: $25 + 23 = 48$.

$x = 7$, $PQ = 25$, $QR = 23$

Scoring: 1 point for the equation and solution, 1 point for each length.

Question 3 Angle addition (3 points)



Solved figure for Question 3.

- $(5x - 4) + (3x + 12) = 128$ gives $8x + 8 = 128$, so $x = 15$.
- $5(15) - 4 = 71^\circ$.

c. $3(15) + 12 = 57^\circ$. Check: $71 + 57 = 128$.

$x = 15, 71^\circ, 57^\circ$

Scoring: 1 point per part.

Question 4 Complements and supplements (2 points)

a. $90^\circ - 63.5^\circ = 26.5^\circ$.

b. $180 - x = 3x$, so $4x = 180$ and $x = 45^\circ$.

(a) 26.5° , (b) 45°

Scoring: 1 point per part.

Question 5 Vertical angles and linear pairs (3 points)

Vertical angles are equal: $6x - 10 = 4x + 20$, so $2x = 30$ and $x = 15$. Each is $6(15) - 10 = 80^\circ$. The other two angles form linear pairs with 80° : $180^\circ - 80^\circ = 100^\circ$.

$x = 15; 80^\circ, 80^\circ, 100^\circ, 100^\circ$

Scoring: 1 point for the equation, 1 point for x , 1 point for the other measures.

Question 6 Angle bisector (3 points)

a. $7x - 9 = 4x + 12$, so $3x = 21$ and $x = 7$.

b. $4(7) + 12 = 40^\circ$.

c. The whole angle is twice a half: $2 \cdot 40^\circ = 80^\circ$.

$x = 7, 40^\circ, 80^\circ$

Scoring: 1 point per part.

Question 7 Midpoint coordinate (2 points)

Midpoint: $(-8.5 + 5.5) \div 2 = -3 \div 2 = -1.5$. Length: $5.5 - (-8.5) = 14$.

Midpoint -1.5 ; PQ = 14

Scoring: 1 point for the midpoint, 1 point for the length.

Question 8 Water station on a trail (2 points)

$TW = 7.8 \div 2 = 3.9$ miles. The bench is between T and W , so $BW = 3.9 - 1.15 = 2.75$ miles.

$TW = 3.9$ mi, $BW = 2.75$ mi

Scoring: 1 point for each distance.