

Compass and Straightedge Constructions

Grade 10 – Geometry math · Test · Standards: G-CO.D.12, G-CO.D.13

Name: _____ Date: _____ Class: _____

Eight questions, 20 points, 45 minutes. Explain every construction in words and give each answer with units. Figures are not drawn to scale.

Standards: G-CO.D.12, G-CO.D.13 · **Level:** Grade 10 Geometry

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Order the bisector steps (2 points)

Put these steps for bisecting $\angle XOY$ in order by writing the numbers.

1. Draw ray OZ from the vertex through the crossing point Z .
2. With the compass point on O , draw an arc that crosses both sides at X and Y .
3. With the same opening, draw arcs from X and from Y that cross at Z .
4. Keep the compass setting equal on both of the last two arcs and wider than half of XY .

Question 2 Perpendicular bisector (3 points)

Segment AB is 15.4 centimeters long. Its perpendicular bisector is constructed with arcs meeting at P and Q and crossing AB at M .

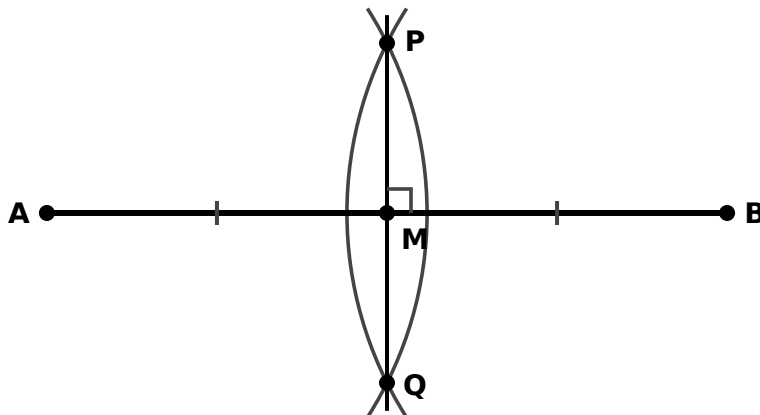


Figure for Question 2.

- a. Find AM . (1 point)
- b. What must the compass opening exceed? (1 point)

c. Which theorem shows that P is equidistant from A and B ? (1 point)

Question 3 Copy an angle (2 points)

$\angle ABC = 57^\circ$ is copied to a new vertex D . Find the measure of the copy (1 point). Which two chords must be equal for the copy to be exact? (1 point)

Question 4 Hexagon in a circle (3 points)

A regular hexagon is inscribed in a circle of radius 7.5 centimeters by stepping the radius around the circle.

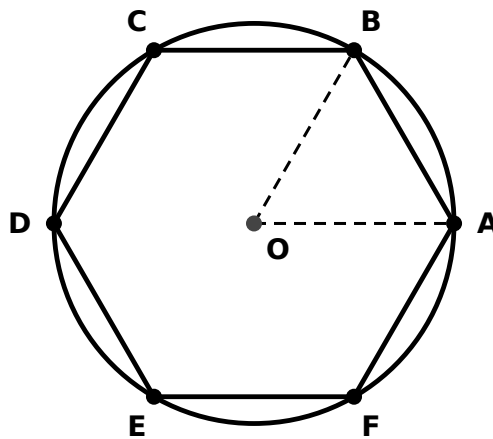


Figure for Question 4.

- Find the side length. (1 point)
- Find the perimeter. (1 point)
- Find the central angle for one side. (1 point)

Question 5 Inscribed square (3 points)

A square is inscribed in a circle of radius 12 centimeters.

- Find the length of the diagonal. (1 point)
- Find the side length to the nearest tenth. (1 point)
- Find the area. (1 point)

Question 6 Prove the triangle is equilateral (3 points)

Arcs centered at A and B , each with radius AB , meet at C . Prove that $\triangle ABC$ is equilateral.

Question 7 Midpoint and perpendicular slope (2 points)

Segment AB has endpoints $A(2, -3)$ and $B(8, 5)$. Find its midpoint (*1 point*) and the slope of its perpendicular bisector (*1 point*).

Question 8 Parallel line construction (2 points)

A line through P is built by copying a 65° corresponding angle at P . Name the theorem that proves the new line parallel to the original (*1 point*), and give the measure of the alternate interior angle (*1 point*).