

Geometry · Geometric Constructions · Test

Common Core G-CO.D.12, G-CO.D.13 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

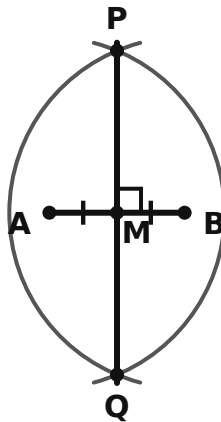
This test has 9 questions worth 20 points in total. It covers constructions with a compass and straightedge, and the measurements and reasons that connect to them. Show your work, write full sentences when explaining, and use no calculator. You have 45 minutes.

Test information

- **Grade:** Geometry
- **Chapter:** Geometric Constructions
- **Common Core:** G-CO.D.12, G-CO.D.13
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 3 pts; Question 4: 2 pts; Question 5: 2 pts; Question 6: 2 pts; Question 7: 3 pts; Question 8: 2 pts; Question 9: 2 pts)

Question 1: Perpendicular bisector measurements (2 points)

Arcs of radius 13 cm centered at A and B cross at P and Q , where $AB = 10$ cm. Line PQ meets AB at M .



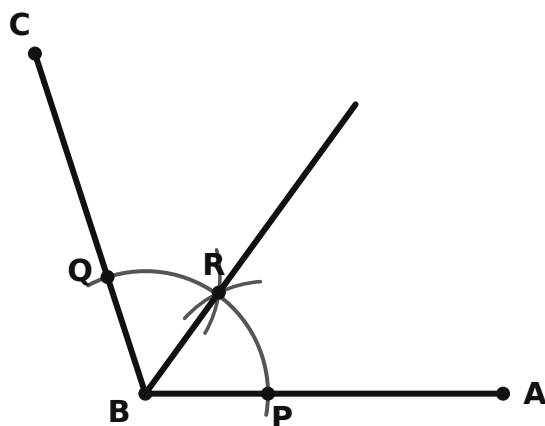
Perpendicular bisector construction with $AB = 10$ cm and arcs of radius 13 cm.

a. Find AM . (1 point)

b. Find PQ . (1 point)

Question 2: Angle bisector with a variable (2 points)

Ray $\overrightarrow{BD}$ bisects $\angle ABC$, with $m\angle ABD = (4x - 6)^\circ$ and $m\angle DBC = (3x + 9)^\circ$.

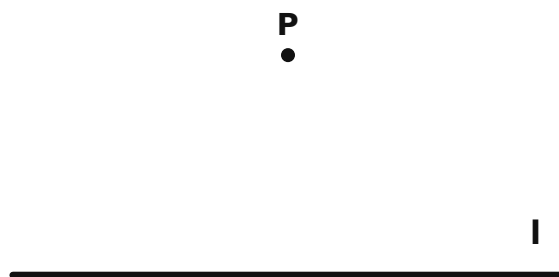


Angle ABC with its bisector drawn by construction arcs.

Find x (1 point) and $m\angle ABC$ (1 point).

Question 3: Perpendicular from a point (3 points)

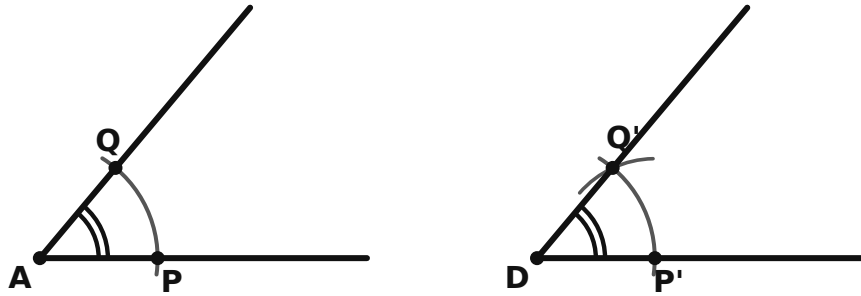
Point P is not on line l . Describe, in order, the steps to construct the line through P perpendicular to l with a compass and straightedge.



Line l and point P not on l .

Question 4: Justify an angle copy (2 points)

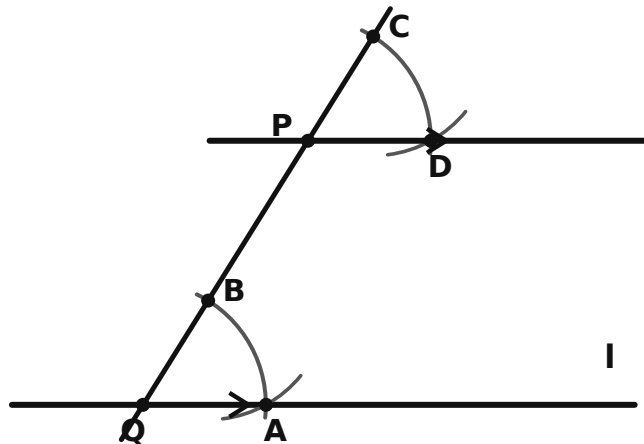
In the construction, $AP = AQ = DP' = DQ'$ and the compass width PQ was copied to $P'Q'$. Explain why $\angle QAP$ is congruent to $\angle Q'DP'$.



Angle copy with points P , Q and P' , Q' .

Question 5: Parallel line construction (2 points)

A student constructs a line through P parallel to line l by copying the 58° angle at Q to point P .

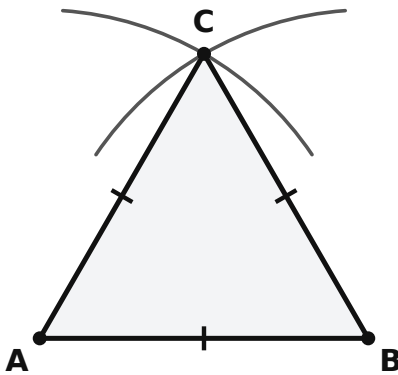


Parallel line construction using a transversal through Q and P .

- What is the measure of the copied angle at P ? (1 point)
- Which theorem shows that the new line is parallel to l ? (1 point)

Question 6: Equilateral triangle (2 points)

Triangle ABC is constructed on $\overline{AB}$ with $AB = 9$ in by drawing arcs of radius AB from A and B .

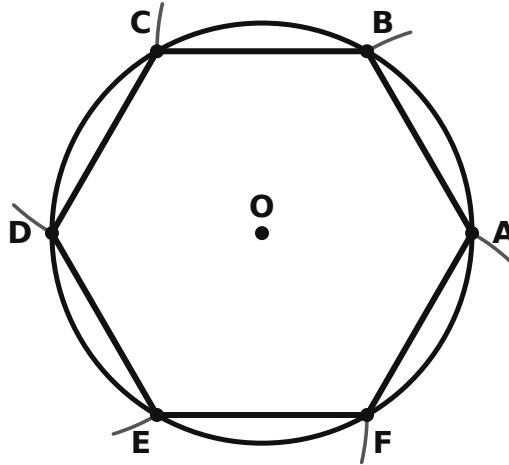


Equilateral triangle ABC built on AB .

- Find the perimeter of triangle ABC . (1 point)
- Find $m\angle C$ and give a reason. (1 point)

Question 7: Regular hexagon in a circle (3 points)

A regular hexagon is inscribed in a circle of radius 8 cm using the compass-and-straightedge method.

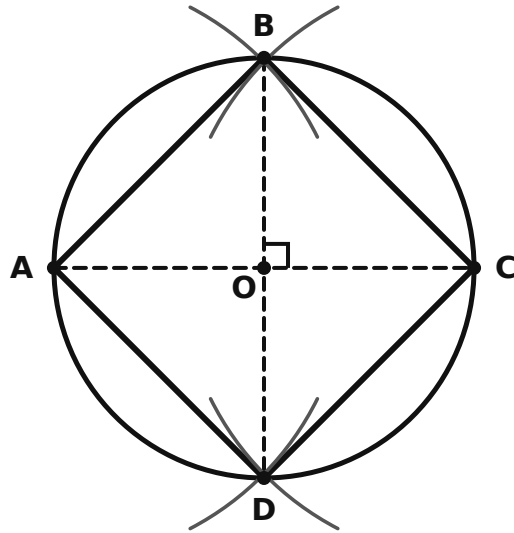


Regular hexagon $ABCDEF$ inscribed in a circle with center O .

- Find the length of each side. (1 point)
- Find the perimeter. (1 point)
- Find the measure of each interior angle of the hexagon. (1 point)

Question 8: Square in a circle (2 points)

Square $ABCD$ is inscribed in a circle with center O and diameter 12 in.



Square ABCD inscribed in a circle with center O.

- Find AC . (1 point)
- Find $m\angle AOB$. (1 point)

Question 9: Compass width (2 points)

Maya wants to bisect $\overline{AB}$, where $AB = 8 \text{ cm}$. She sets the compass to 3 cm and draws arcs centered at A and B . Explain what goes wrong, and give the condition that the compass radius must meet.