

Construction 9

Given a point outside a circle, construct a tangent to the circle from the given point.

Given: Point P outside $\odot O$

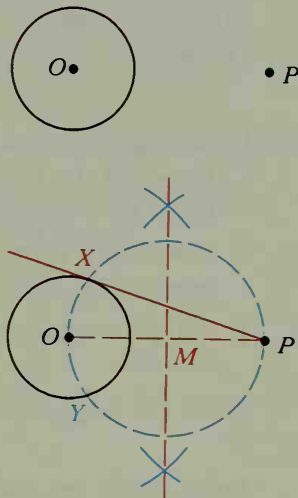
Construct: A tangent to $\odot O$ from P

Procedure:

1. Draw \overline{OP} .
2. Find the midpoint M of \overline{OP} by constructing the perpendicular bisector of \overline{OP} .
3. Using M as center and MP as radius, draw a circle that intersects $\odot O$ in a point X .
4. Draw \overrightarrow{PX} .

\overrightarrow{PX} is tangent to $\odot O$ from P . \overrightarrow{PY} , not drawn, is the other tangent from P .

Justification: If you draw \overline{OX} , $\angle OXP$ is inscribed in a semicircle. Then $\angle OXP$ is a right angle and $\overrightarrow{PX} \perp \overline{OX}$. Because \overrightarrow{PX} is perpendicular to radius \overline{OX} at its outer endpoint, \overrightarrow{PX} is tangent to $\odot O$.



Construction 10

Given a triangle, circumscribe a circle about the triangle.

Given: $\triangle ABC$

Construct: A circle passing through A , B , and C

Procedure:

1. Construct the perpendicular bisectors of any two sides of $\triangle ABC$. Label the point of intersection O .
2. Using O as center and OA as radius, draw a circle.

Circle O passes through A , B , and C .

Justification: See Theorem 10-2 on page 387.

