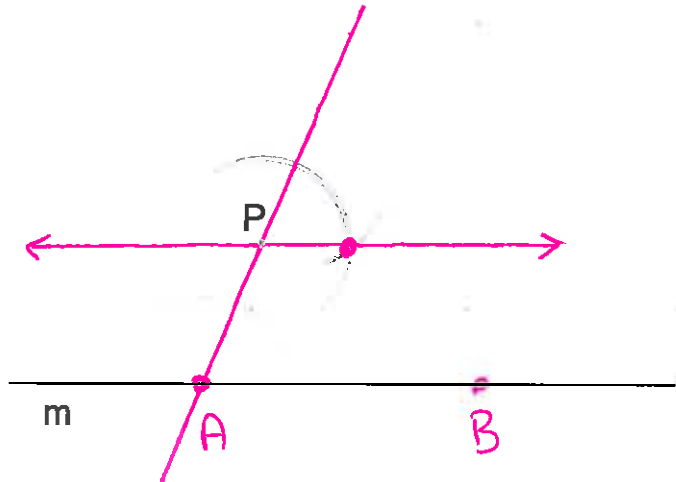


Parallel & Perpendicular Constructions

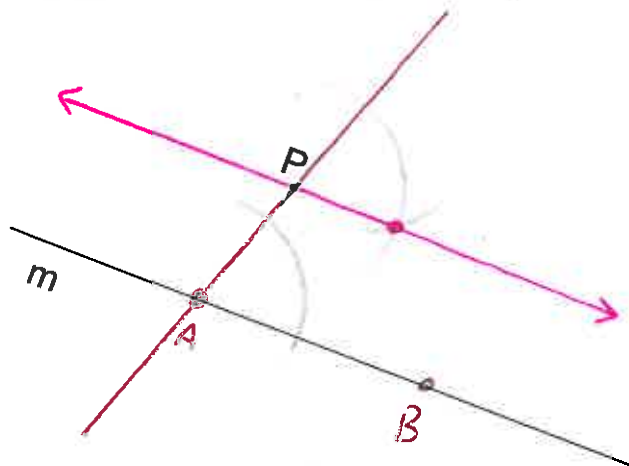
Construct a Parallel Line (to a given line, through a point not on the line)



Steps:

1. Label points A and B on line m and draw ray \overline{AP} .
2. Construct an angle with vertex at P congruent to $\angle PAB$.
(Congruent Angle Construction from unit 1 with \overline{AP} to begin)

Practice: Construct a line parallel to line m through point P.

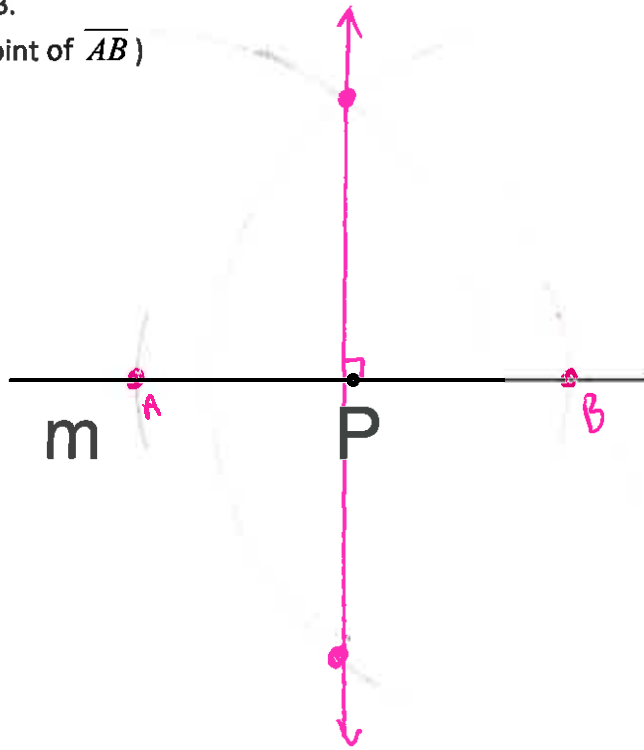


Construct a Perpendicular Line (to a given line *through a point on the line*)

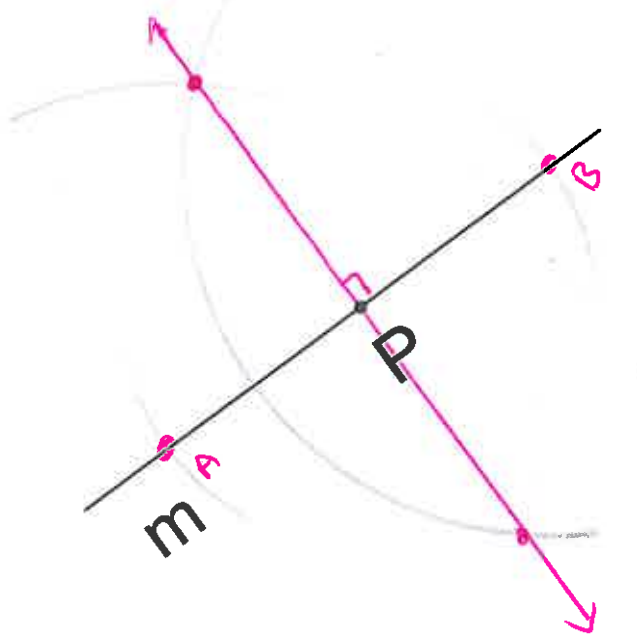
Steps:

1. With compass point on P, draw two arcs intersecting line m. Label the points of intersection A and B.
(P is now the midpoint of \overline{AB})

2. Construct the \perp bisector of \overline{AB} .
(\perp Bisector Construction from unit 1)



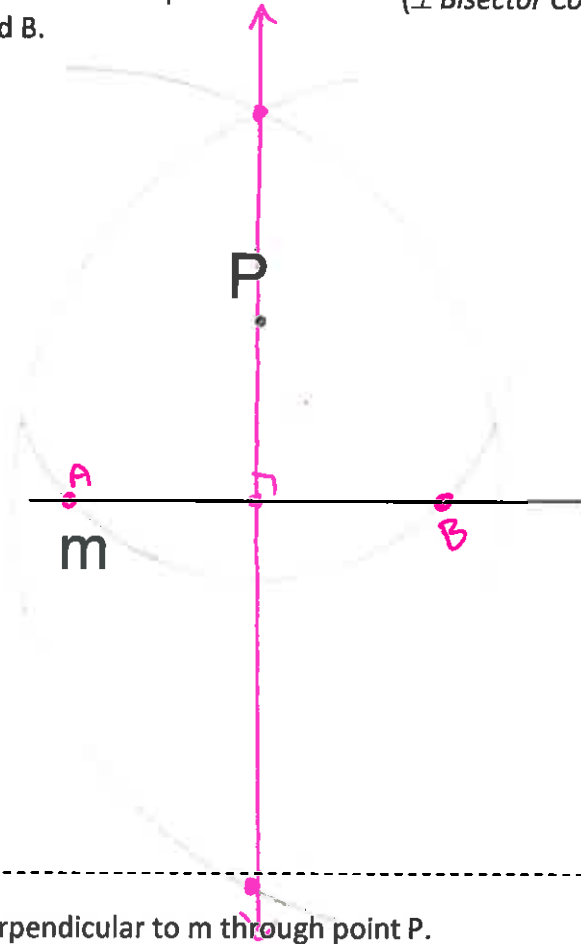
Practice: Construct a line perpendicular to line m through point P.



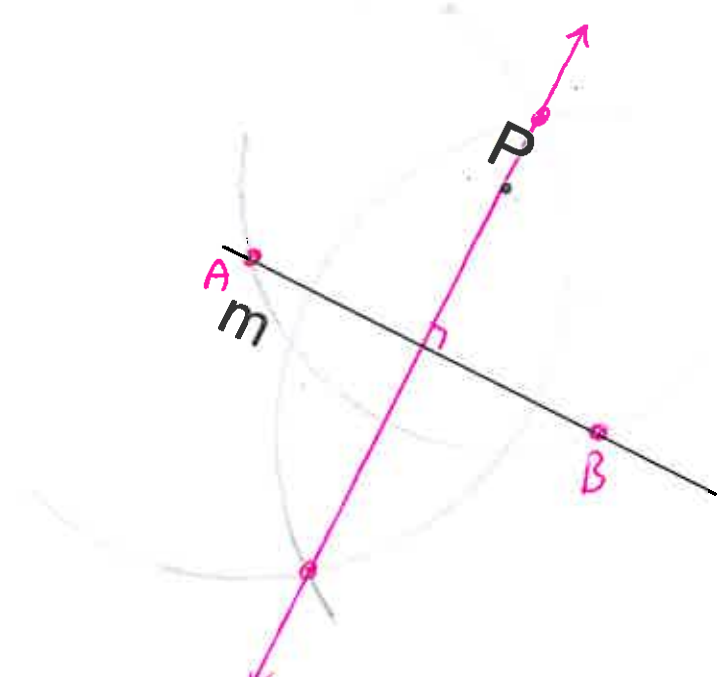
Construct a Perpendicular Line (to a given line *through a point NOT on the line*)

Steps:

1. With compass point on P, draw two arcs intersecting line m. Label the points of intersection A and B.
2. Construct the \perp bisector of \overline{AB} . (\perp Bisector Construction from unit 1)

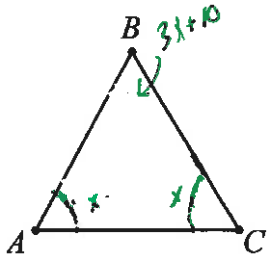


Practice: Construct a line perpendicular to m through point P .



Triangle Properties - Triangle Angle Sum Theorem & Exterior Angle Theorem

Triangle Angle Sum Theorem: the angles of a \triangle add to 180° .

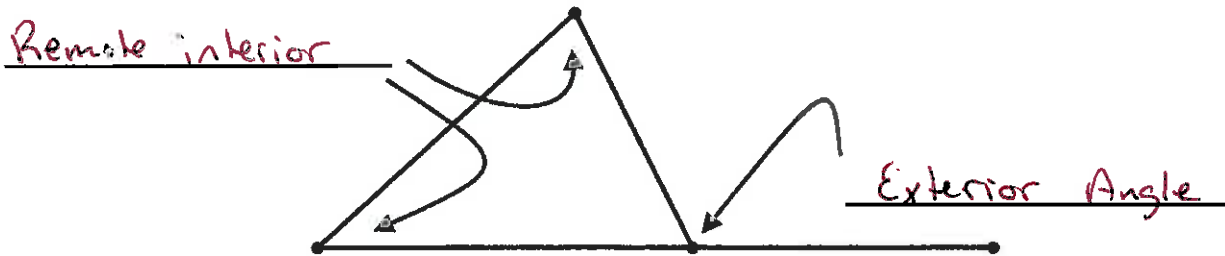


Example: Given $\angle A \cong \angle C$ and $m\angle B$ is 10 more than three times $m\angle A$. Find $m\angle B$.

$$\begin{aligned} x + x + 3x + 10 &= 180 \\ 5x + 10 &= 180 \\ 5x &= 170 \\ x &= 34 \end{aligned}$$

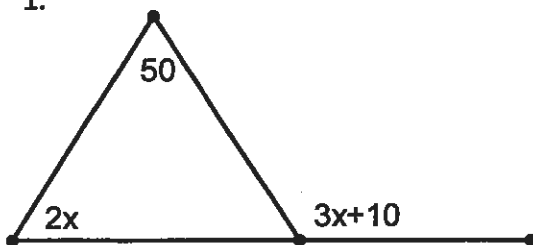
$$\begin{aligned} m\angle B &= 3(34) + 10 \\ &= 112^\circ \end{aligned}$$

Exterior Angle Theorem: Exterior \angle = Sum of the remote interior angles.



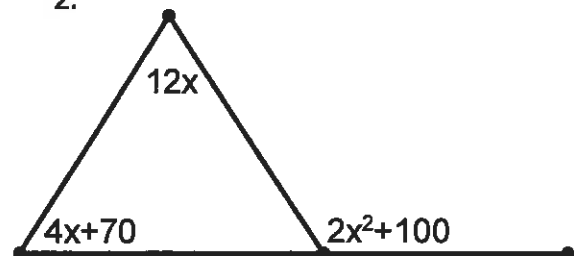
Example: Find the value of x .

1.



$$\begin{aligned} 3x + 10 &= 2x + 50 \\ 3x &= 2x + 40 \\ \mathbf{x} &= \mathbf{40} \end{aligned}$$

2.



$$\begin{aligned} 2x^2 + 100 &= 4x + 70 + 12x \\ 2x^2 + 100 &= 16x + 70 \\ 2x^2 - 16x + 30 &= 0 \\ x^2 - 8x + 15 &= 0 \\ (x - 5)(x - 3) &= 0 \\ \mathbf{x} &= \mathbf{5} \quad \mathbf{x} = \mathbf{3} \end{aligned}$$