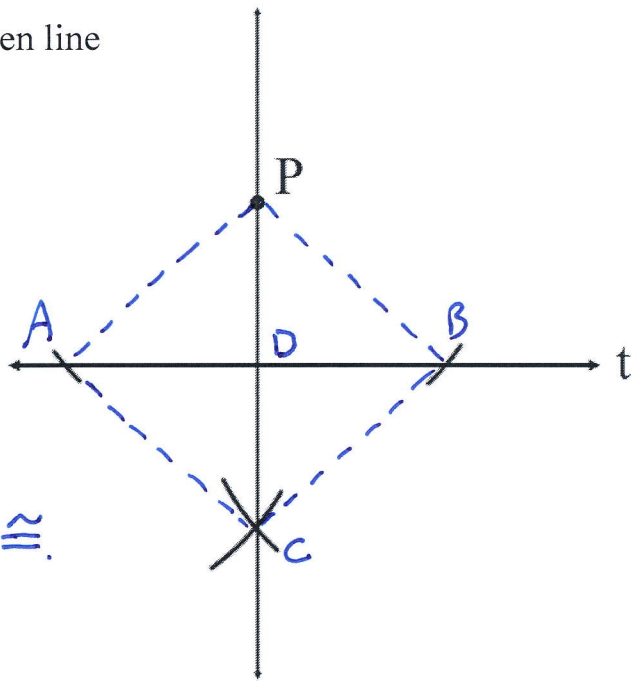


Worked Example – Using Congruent Triangles to Prove Constructions

Construct and prove: Through a point not on a given line there exists a line perpendicular to the given line.

Line t and point P are given.

Prove: $\overleftrightarrow{PC} \perp t$



statements	Reasons
① $\overline{PA} \cong \overline{PB}$ $\overline{AC} \cong \overline{BC}$	① By Construction
② $\overline{PC} \cong \overline{PC}$	② Reflexive property of \cong .
③ $\triangle PAC \cong \triangle PBC$	③ S.S.S. (1,2)
④ $\angle APD \cong \angle BPD$	④ C.P.C.T.C. (3) *
⑤ $\overline{PD} \cong \overline{PD}$	⑤ Reflexive prop. of \cong
⑥ $\triangle PAD \cong \triangle PBD$	⑥ S.A.S. (1,4,5)
⑦ $\angle ADP \cong \angle BDP$	⑦ C.P.C.T.C. (6) *
⑧ $\angle ADP$ and $\angle BDP$ are a linear pair.	⑧ Definition of a linear pair.
⑨ $\angle ADP$ and $\angle BDP$ are supplementary	⑨ \angle s in a linear pair are supplementary. (8)
⑩ $m\angle ADP + m\angle BDP$ $= 180^\circ$	⑩ Def. of supplementary (9)
⑪ $m\angle ADP = m\angle BDP$	⑪ Def. of $\cong \angle$ s. (7)
⑫ $m\angle ADP + m\angle ADP$ $= 180^\circ$	⑫ Substitution (10, 11)
⑬ $2(m\angle ADP) = 180^\circ$	⑬ Algebra. (12)

(continued)

statements	Reasons
⑭ $m\angle ADP = 90^\circ$	⑭ Algebra (13)
⑮ $\angle ADP$ is a right angle.	⑮ Def. of right angle. (14)
⑯ $\overleftrightarrow{PC} \perp t$	⑯ Def. of perpendicular lines. (15)

* "Corresponding Parts of Congruent Triangles are Congruent" or Def. of $\cong \triangle$.

Objective: Use congruent triangles to prove constructions.