3.2 Proofs and Perpendicular Lines

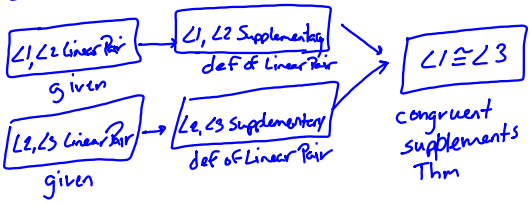
Flow proof

Diagram

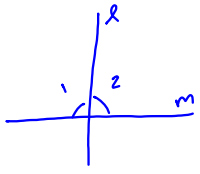
Boxes and Arrows with reasons given for each box

G: $\angle 1, \angle 2$ Linear Pair
$\angle 2, \angle 3$ Linear Pair

P: $\angle 1 \cong \angle 3$



Thm 3.1 If two lines intersect to form a linear pair of congruent angles, then the lines are perpendicular



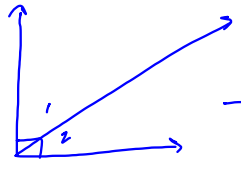
if ℓ, m intersect so that $\angle 1 \cong \angle 2$ and $\angle 1, \angle 2$ are linear pair

$\ell \perp m$

given $\angle 1, \angle 2$ Linear Pair, $\angle 1 \cong \angle 2$? $\ell \perp m$

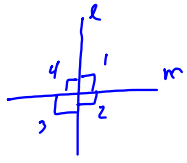
$\angle 1, \angle 2$ Linear Pair	Given
$\angle 1, \angle 2$ Supplementary	def of linear pair
$m\angle 1 + m\angle 2 = 180$	def of Supp
$\angle 1 \cong \angle 2$	given
$m\angle 1 = m\angle 2$	def of $\cong$
$m\angle 1 + m\angle 2 = 180$	Distribution
$2(m\angle 2) = 180$	Divide (2)
$m\angle 2 = 90$	Def of rt $\angle$
$\angle 2$ is a rt angle	Def of $\perp$
$\ell \perp m$	

Thm 3.2 If two sides of two adjacent angles are perpendicular then the two angles are complimentary

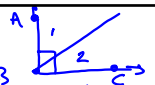


→ $\angle 1, \angle 2$ complimentary

Thm 3.3 If two lines are perpendicular, then they intersect to form 4 right $\angle$'s



Proof 3.2



Given $\overrightarrow{BA} \perp \overrightarrow{BC}$ Prove: $\angle 1, \angle 2$ complimentary

$\overrightarrow{BA} \perp \overrightarrow{BC}$	given
$\angle ABC$ is a rt angle	def of $\perp$
$m\angle ABC = 90^\circ$	def of rt $\angle$
$m\angle 1 + m\angle 2 = m\angle ABC$	Angle Addition
$m\angle 1 + m\angle 2 = 90^\circ$	Transitive prop of =
$\angle 1, \angle 2$ are complimentary	def of comp.