Proof from class	Notes and comments
Given $\overline{AB}$ and $\overline{AC}$ such that	
• A, B and C are all on the same line	Equivalent to saying $\overline{AB}$ and $\overline{AC}$ are on the same line
• B and C are the same direction from A	Equivalent to saying B and C are on same side of A on the line
• $\overline{AB} \cong \overline{AC}$	
To prove: $\overline{AB} = \overline{AC}$	Equivalent to proving that B=C
Proof:	
Suppose $B \neq C$	Equivalent to supposing that $\overline{AC} \neq \overline{AB}$
Since A, B and C are on the same line, one point is between the other two, and because B and C are in the same direction from A, A is not between B and C, so *either* B is between A and C *or* C is between A and B.	
Without loss in generality, we may assume that B is between A and C	Saying "without loss in generality, we may assume" means that there are two conditions that are essentially the same, and we're just going to write the proof for one of them. You can say this any time you're sure (and it's clear) that the two cases are interchangeable.
$m(\overline{AB}) + m(\overline{BC}) = m(\overline{AC})$ (axiom 3)	Because B is between A and C and lies on the line, it is on the segment $\overline{AC}$
We know $m(\overline{AB}) = m(\overline{AC})$	Because $\overline{AB} \cong \overline{AC}$ and definition of congruence
So, $m(\overline{AB}) + m(\overline{BC}) = m(\overline{AB})$	Algebraic substitution
And $m(\overline{BC}) = 0$	Subtract $m(\overline{AB})$ from both sides
Hence B = C	Using axiom 3 part i. a.
Therefore $\overline{AB} = \overline{AC}$ $\square$	

Assignment: prove

If two congruent angles share a side and whose other sides lie on the same side of the shared side, then their other sides are also shared, and the angles are identically equal as point sets.