

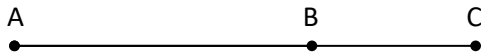
**SOLVING AN EQUATION IN GEOMETRY:**

Solving for a variable to determine an angle or segment measure can be done as a proof. A **proof** is an argument that uses logic, definitions, properties, and previously proven statements to show that a conclusion is true.

**Note:** When doing algebraic operations, we need to deal with segment lengths and angle measures.

**Remember,** always write the equation using segment names or angles first with the reason as the appropriate postulate.

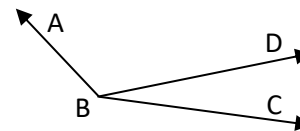
**Segment Addition Postulate**



$$AB + BC = AC$$

**NOT**  $\overline{AB} + \overline{BC} = \overline{AC}$

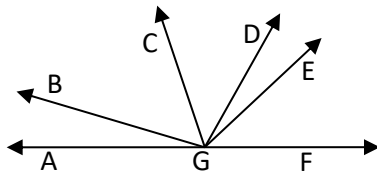
**Angle Addition Postulate**



$$m\angle ABD + m\angle DBC = m\angle ABC$$

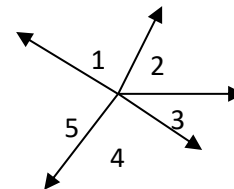
**NOT**  $\angle ABD + \angle DBC \cong \angle ABC$

**Consecutive Adjacent Angles on a Line Sum to 180°**



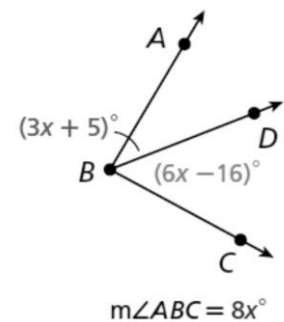
$$m\angle AGB + m\angle BGC + m\angle CGD + m\angle DGE + m\angle EGF = 180^\circ$$

**Angles at a Point Sum to 360°**

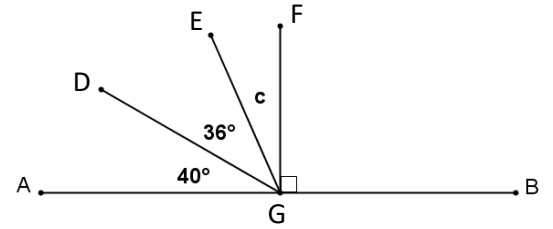


$$m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 + m\angle 5 = 360^\circ$$

- (Extend from the Angle Addition Postulate) Given the drawing at right, prove  $11=x$ . Write a justification for each non-algebraic step.

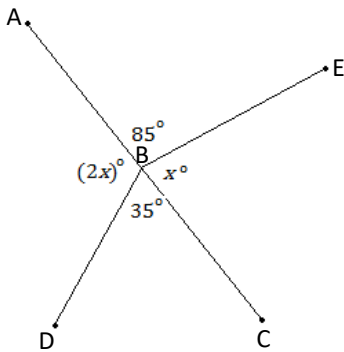


2. Given  $\overline{AGB}$ ,  $\overline{DG}$ ,  $\overline{EG}$ , and  $\overline{FG}$  intersect at G. Find the value of the variable c. Show all and give reasons for each non-algebraic step.

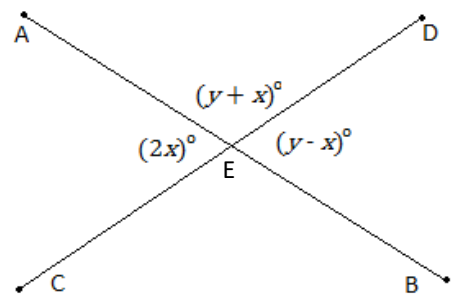


For the problems below, determine the value of all variables. Show all the steps and reasons for your solution (non-algebraic steps).

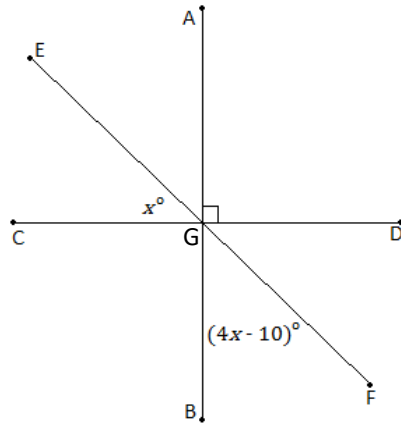
3. Not drawn to scale: A, B, and C are not collinear; all the segments intersect at B.



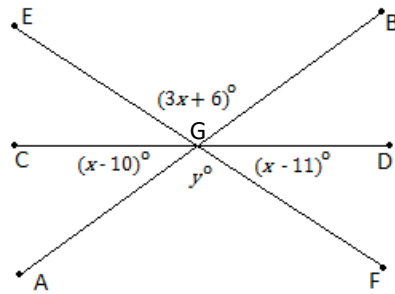
4.  $\overline{AB}$  &  $\overline{CD}$  intersect at E (Systems)



5.  $\overline{EF}$ ,  $\overline{CD}$  &  $\overline{AB}$  intersect at G



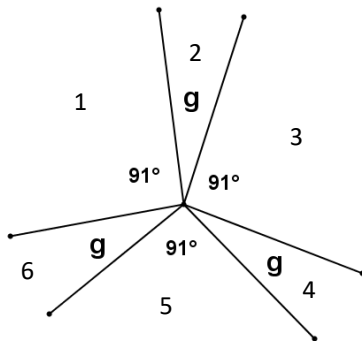
6.  $\overline{EF}$ ,  $\overline{CD}$  &  $\overline{AB}$  intersect at G



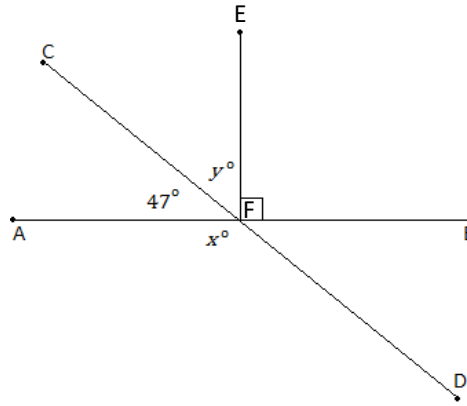
### Problem Set

For 7-9, determine the value of  $x$  and/or  $y$  in each diagram below. Show all the steps and explain your reasoning along the way. If you need help with the systems of equations, refer to your textbook pages 152-153 and the earlier example in the notes.

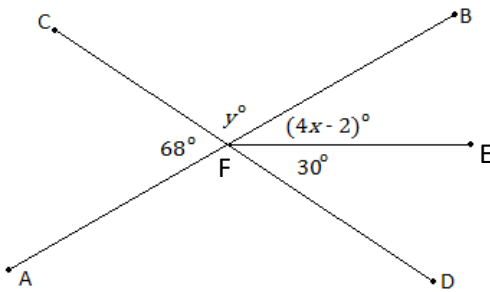
7.



8.  $\overline{CD}$ ,  $\overline{EF}$  &  $\overline{AB}$  intersect at F and  $m\angle EFB = 90^\circ$



9.  $\overline{CD}$  &  $\overline{AB}$  intersect at F (System)



10. Given:  $\overline{FD}$  bisects  $\angle EFB$ ,  $\overline{CFD}$ ,  $\overline{AFB}$ . Determine the value of all the angles.

