

## Lesson 1-8 LAB - Sum of Angles

### Agenda

- Check and Review Homework 1-7
- \*Need Pouch
- Lesson 1-8 Notes
- Take out Lesson Summary/Outline
- Quiz

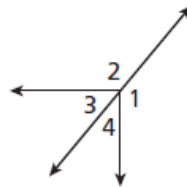
### Homework - Day 8

**Complete Worksheet 1-8**

### PRACTICE AND PROBLEM SOLVING

Tell whether the angles are only adjacent, adjacent and form a linear pair, or not adjacent.

14.  $\angle 1$  and  $\angle 4$  **adj.;** 15.  $\angle 2$  and  $\angle 3$  **adj.;** **lin. pair**  
 16.  $\angle 3$  and  $\angle 4$  **lin. pair** 17.  $\angle 3$  and  $\angle 1$  **not adj.**  
**only adj.**



Given  $m\angle A = 56.4^\circ$  and  $m\angle B = (2x - 4)^\circ$ , find the measure of each of the following.

18. supplement of  $\angle A$   **$123.6^\circ$**  19. complement of  $\angle A$   **$33.6^\circ$**   
 20. supplement of  $\angle B$   **$(184 - 2x)^\circ$**  21. complement of  $\angle B$   **$(94 - 2x)^\circ$**   
 22. **Multi-Step** An angle's measure is 3 times the measure of its complement.  
 Find the measure of the angle and the measure of its complement.  **$67.5^\circ$ ;  $22.5^\circ$**

**32.** The measure of an acute  $\angle$  is less than  $90^\circ$ . Therefore the measure of its supp. must be between  $90^\circ$  and  $180^\circ$ , which means the supp. is an obtuse  $\angle$ .

32. **Critical Thinking** Explain why an angle that is supplementary to an acute angle must be an obtuse angle.



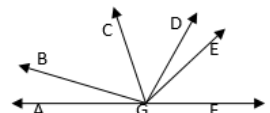
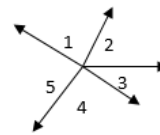
33. This problem will prepare you for the Multi-Step Test Prep on page 34.  $H$  is in the interior of  $\angle JAK$ .  $m\angle JAH = (3x - 8)^\circ$ , and  $m\angle KAH = (x + 2)^\circ$ . Draw a picture of each relationship. Then find the measure of each angle.
- $\angle JAH$  and  $\angle KAH$  are complementary angles.  $m\angle JAH = 64^\circ$ ;  $m\angle KAH = 26^\circ$
  - $\angle JAH$  and  $\angle KAH$  form a linear pair.  $m\angle JAH = 131.5^\circ$ ;  $m\angle KAH = 48.5^\circ$
  - $\angle JAH$  and  $\angle KAH$  are congruent angles.  $m\angle JAH = m\angle KAH = 7^\circ$

36. If two angles are supplementary and congruent, the measure of each angle is  $90^\circ$ . **T**
37. If a ray divides an angle into two complementary angles, then the original angle is a right angle. **T**
44. The supplement of an angle is 4 more than twice its complement. Find the measure of the angle.  $4^\circ$

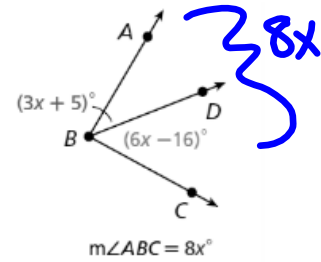
Lesson 1-7K & 1-8L Note Sheet: Sum of Angles at a Point & Consecutive Adjacent Angles on a Line

**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.

|   |   |
|---|---|
| <p><b>Note:</b> When doing algebraic operations, we need to deal with <u>segment lengths</u> and <u>angle measures</u>.</p> <p><b>Remember,</b> always <u>write the equation</u> using <u>segment names or angles first</u> with the reason as the appropriate postulate.</p> |   |
| <p><b>Segment Addition Postulate</b></p>  <p><math>AB + BC = AC</math></p> <p><b>NOT</b> <math>\overline{AB} + \overline{BC} = \overline{AC}</math></p>                                    | <p><b>Angle Addition Postulate</b></p>  <p><math>m\angle ABD + m\angle DBC = m\angle ABC</math></p> <p><b>NOT</b> <math>\angle ABD + \angle DBC \cong \angle ABC</math></p> |
| <p><b>Consecutive Adjacent Angles on a Line Sum to <math>180^\circ</math></b></p>  <p><math>m\angle AGB + m\angle BGC + m\angle CGD + m\angle DGE + m\angle EGF = 180^\circ</math></p>     | <p><b>Angles at a Point Sum to <math>360^\circ</math></b></p>  <p><math>m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 + m\angle 5 = 360^\circ</math></p>                    |

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



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

ANGLE ADDITION POSTULATE

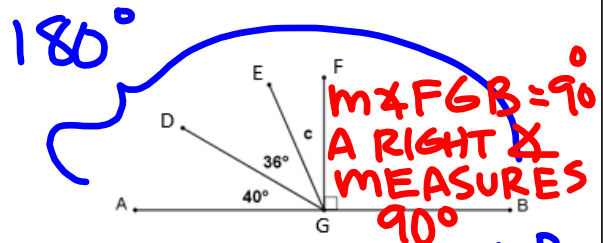
$$(3x + 5)^\circ + (6x - 16)^\circ = 8x \quad \text{SUBSTITUTION}$$

$$9x - 11 = 8x$$

$$9x = 8x + 11$$

$$\boxed{x = 11}$$

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.



$$m\angle AGD + m\angle DGE + m\angle EGF + m\angle FGB = 180^\circ$$

ANGLES ON A LINE SUM TO  $180^\circ$

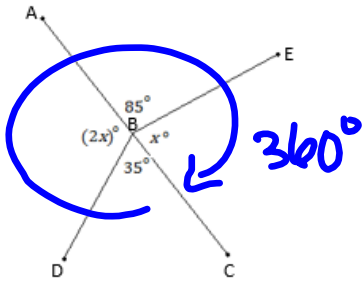
$$40^\circ + 36^\circ + c + 90^\circ = 180^\circ$$

$$166^\circ + c = 180^\circ$$

$$\boxed{c = 14}$$

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.



$m\angle ABE + m\angle EBC + m\angle CBD + m\angle DBA = 360^\circ$   
 ANGLES AT A POINT SUM TO  $360^\circ$

$$85^\circ + x + 35 + 2x = 360$$

$$120 + 3x = 360$$

$$3x = 240$$

$$x = 80$$

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

$m\angle AED + m\angle DEB = 180^\circ$   
 ANGLES ON A LINE SUM TO  $180^\circ$

$(y+x) + (y-x) = 180$  SUBSTITUTION

$2y = 180$   
 $y = 90$

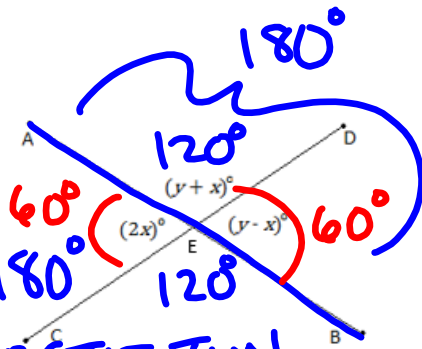
$\angle AEC \cong \angle DEB$   
 VERTICAL  $\angle$ 'S ARE  $\cong$

$2x = y - x$  SUBSTITUTION

$2x = 90 - x$   
 $+x \quad +x$

$3x = 90$

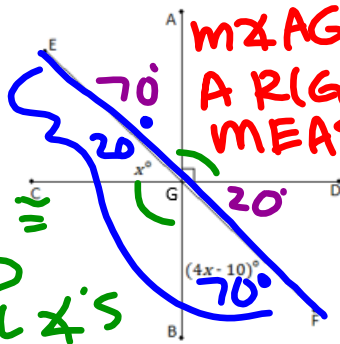
$x = 30$



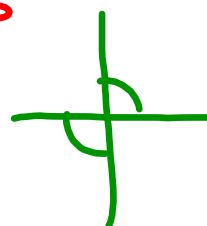
5.  $\overline{EF}$ ,  $\overline{CD}$  &  $\overline{AB}$  intersect at G

ANGLES ON A LINE SUM TO  $180^\circ$

$\angle CGB \cong \angle AGD$   
VERTICAL  $\angle$ 'S ARE  $\cong$   
 $m\angle CGB = 90^\circ$



$m\angle AGD = 90^\circ$   
A RIGHT ANGLE MEASURES  $90^\circ$



$m\angle EGC + m\angle CGB + m\angle BGF = 180^\circ$

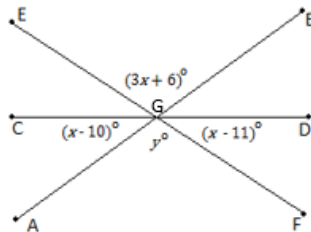
$x + 90^\circ + (4x - 10) = 180$

$5x + 80 = 180$

$5x = 100$

$x = 20$

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

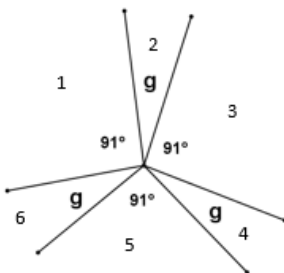


- Take out lesson Summary to use for Quiz
- Hand in Quiz
- work on HW (complete worksheet)

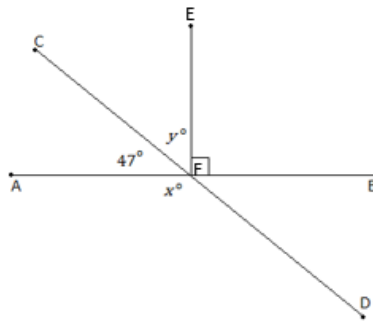
**Problem Set**

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.

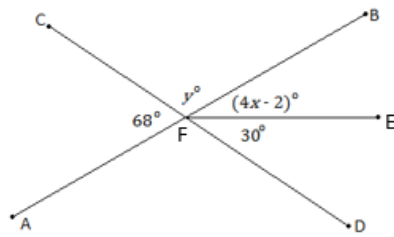
7.



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.

