Warm-up

$5x+3(x+4)=28$

$9x-5(3x-12)=30$

$9x-15x+60=30$

$-6x+60=30$

$-60 \quad -60$

$\frac{-6x}{-6} = \frac{-30}{-6}$

$x=5$

Name:_____ Date:_____

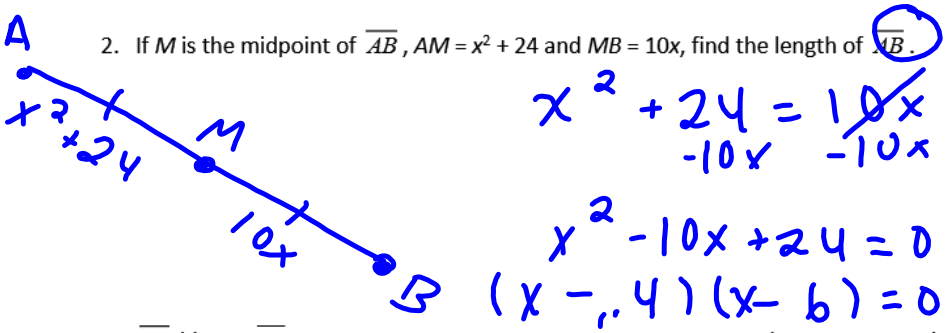
Geometry Homework: Intro Geo Proofs – 1

1. Draw a single diagram to illustrate the following givens: $\overline{ILAT}$, $\overline{CAP}$.

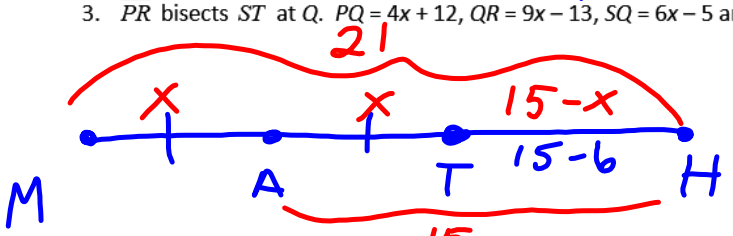
   Notes: 1) Since they are written separately, you should *not* assume that *all* the points are collinear.

   2) There cannot be two different points *A* in the same problem.

2. If *M* is the midpoint of $\overline{AB}$, $AM = x^2 + 24$ and $MB = 10x$, find the length of $\overline{AB}$.



3. $\overline{PR}$ bisects $\overline{ST}$ at *Q*. $PQ = 4x + 12$, $QR = 9x - 13$, $SQ = 6x - 5$ and $QT = 3x + 16$. Find the length of $\overline{PR}$.



4. Given: $\overline{MATH}$, *A* is the midpoint of $\overline{MT}$, $MH = 21$ and $AH = 15$. Find *TH*.

$x + x + 15 - x = 21$

$x + 15 = 21$

$-15 \quad -15$

$x = 6$

$TH = 9$

5. In $\overline{RST}$, $RS = 7x - 1$, $ST = 2x + 3$ and $RT = 12x - 7$. Find the numerical value of *RT*.

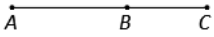
READ: Adding and Subtracting Line Segments

Everybody knows you can add and subtract numbers: 7 + 3 = 10 and 7 – 3 = 4 make perfect sense. However, adding and subtracting *people* (not *numbers* of people but actual persons) is meaningless. It is nonsense to say Devin + Bree = Ken or Devin – Bree = Thor.

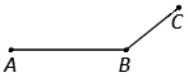
Line segments are somewhere in between. In general, you can't add or subtract just any two random line segments and get another segment. But *sometimes* it makes sense. Your job is to understand when.

IMPORTANT:

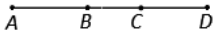
1) $\overline{AB}+\overline{BC}=\overline{AC}$ only makes sense when *A*, *B*, and *C* are collinear and *B* is between *A* and *C*. In other words, to add segments, they must be collinear and the second one must start where the first one ends.



$\overline{AB}+\overline{BC}=\overline{AC}$



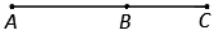
$\overline{AB}+\overline{BC}=$ nonsense



$\overline{AB}+\overline{CD}=$ nonsense

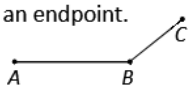
$\overline{AC}+\overline{BD}=$ nonsense

2) $\overline{AC}-\overline{BC}=\overline{AB}$ and $\overline{AC}-\overline{AB}=\overline{BC}$ only make sense when *A*, *B*, and *C* are collinear and *B* is between *A* and *C*. In other words, to subtract segments, the one being subtracted must be part of the one being subtracted from and they must share an endpoint.



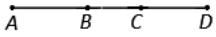
$\overline{AC}-\overline{BC}=\overline{AB}$

$\overline{AC}-\overline{AB}=\overline{BC}$



$\overline{AC}-\overline{BC}=$ nonsense

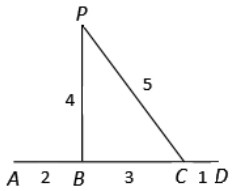
$\overline{AC}-\overline{BC}=$ nonsense



$\overline{AD}-\overline{BC}=$ nonsense

$\overline{AC}-\overline{BD}=$ nonsense

6. Based on the diagram at right, tell if each of the following is True or False. Remember the difference between $\overline{AB}$ and AB.



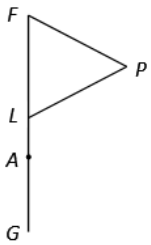
a. $AB + BC = CP$ b. $\overline{AB} + \overline{BC} = \overline{CP}$

c. $AB + BC = AC$ d. $\overline{AB} + \overline{BC} = \overline{AC}$

e. $AC - BC = AB$ f. $\overline{AC} - \overline{BC} = \overline{AB}$

g. $PC - PB = CD$ h. $\overline{PC} - \overline{PB} = \overline{CD}$

7. In the diagram at right, $\overline{FLAG}$. For each of the following, either fill in the appropriate line segment or write "nonsense."



a. $\overline{LA} + \overline{AG} =$ _____ b. $\overline{FL} + \overline{LP} =$ _____ c. $\overline{FA} + \overline{LG} =$ _____

d. $\overline{FL} + \overline{AG} =$ _____ e. $\overline{FL} + \overline{LG} =$ _____ f. $\overline{FL} + \overline{LA} + \overline{AG} =$ _____

g. $\overline{FP} + \overline{FL} =$ _____ h. $\overline{FA} + \overline{LA} =$ _____ i. $\overline{FA} - \overline{LA} =$ _____

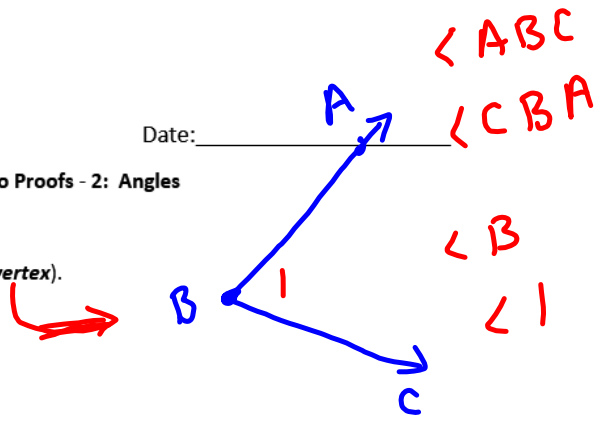
j. $\overline{FP} - \overline{FL} =$ _____. k. $\overline{FG} - \overline{FL} =$ _____ l. $\overline{FG} - \overline{LA} =$ _____

Name:_____ Date:_____

Geometry Notes Intro to Geo Proofs - 2: Angles

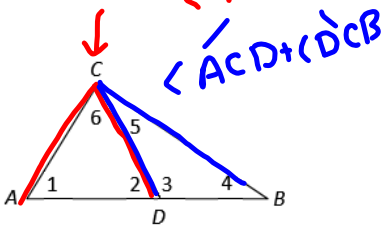
Definitions (continued)

An ***angle*** is the union of two rays with a common endpoint (the ***vertex***).



NOTE: Angles may be named in three ways.

1. By three letters, with the middle letter at the vertex,
2. (Sometimes) by a single letter at the vertex (***only if there is no chance of confusion***),
3. By a number or lower case letter placed inside the angle near the vertex.



Ex: In the diagram at right,

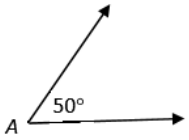
∠A

∠CAD

The ***measure of an angle*** is the number of ***degrees*** in the angle.

$m\angle A = 50$

Note: The measure of an angle is a measure of *rotation* (turning).
It has nothing to do with the "lengths" of the sides.



Acute angle: less than 90°

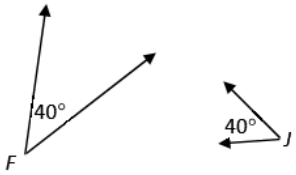
Right angle: 90°

Obtuse angle: greater than 90°

Straight angle: ⟷ 180°

Congruent angles: Two angles that have the same measure.

$\angle F \cong \angle J$



90°

Perpendicular lines form right angles

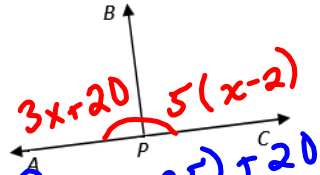
Perpendicular segments (or lines or rays)

⊥

* We don't know if they are ⊥ Trying to Prove

* We do know straight line = 180

Ex: Given $\overleftrightarrow{APC}$ and $\overrightarrow{BP}$, $m\angle APB = 3x + 20$ and $m\angle CPB = 5(x-2)$. Determine if $\overrightarrow{PB} \perp \overleftrightarrow{APC}$.



$3x + 20 + 5(x-2) = 180$

$3x + 20 + 5x - 10 = 180$

$8x + 10 = 180$

$-10 \quad -10$

$8x = 170$

$x = 21.25$

$3(21.25) + 20$

$63.75 + 20$

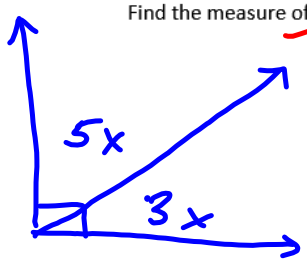
83.75

* Not ⊥ b/c $\angle APB$ is not a right

Two angles are ***complementary*** if their measures Add to 90°

Two angles are ***supplementary*** if their measures Add to 180°

Ex: The measures of two complementary angles are in the ratio 3:5. Find the measure of the larger angle.



90

$3x \quad 5x$

larger ∠

$5x$

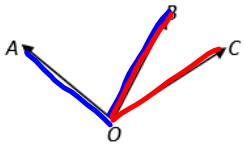
$5(11.25) = 56.25$

$5x + 3x = 90$

$\frac{8x}{8} = \frac{90}{8}$

$x = 11.25$

Two ***adjacent angles*** share a common ray but have no interior points in common.

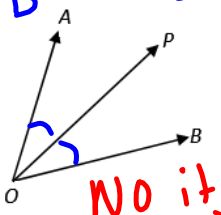


$\angle AOB + \angle BOC = \angle AOC$

bisector

$\angle AOP \cong \angle POB$

Angle bisector: A ray that divides an angle into two congruent angles.



NO it does not bisect the $\angle$ they are not $=$

Postulate: Every angle has exactly one bisector.

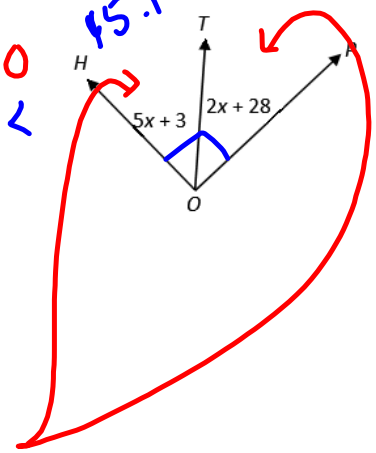
Ex: $\overline{HO} \perp \overline{OP}$, $m\angle HOT = 5x + 3$ and $m\angle POT = 2x + 28$.

right $\angle$

Does $\overline{OT}$ bisect $\angle HOP$?

Prove $\angle$s are $=$

* We know we have a right $\angle$ 90



$5x + 3 + 2x + 28 = 90$

$7x + 31 = 90$

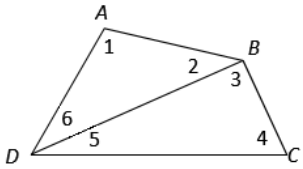
$-31 \quad -31$

$\frac{7x}{7} = \frac{59}{7}$ $x = 8.43$

Name:_____ **Date:**_____

Geometry Homework: Intro Geo Proofs - 2

1. Use the diagram at right to answer the following.



   a. How many angles in the diagram have their vertex at *A*?

   b. How many angles in the diagram have their vertex at *B*?

   c. What angle (number) is named $\angle BDC$?

   d. Name two adjacent angles in the diagram.

   e. Are $\angle ADC$ and $\angle BDC$ adjacent?

   f. Give three alternate names for $\angle 4$.

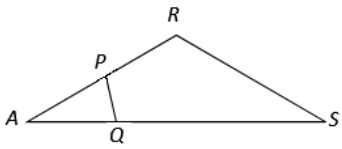
   g. Explain why we should *not* refer to $\angle D$ in the diagram. (Yes, you may lose points for sloppy notation on quizzes and tests.)

   h. Name one acute angle on the diagram.

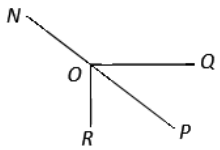
   i. Name one obtuse angle on the diagram.

   j. Which angle on the diagram appears to be closest to a right angle?

2. In the diagram at right, which angle has a larger measure, $\angle PAQ$ or $\angle RAS$?



3. In the diagram at right, $\overline{NOP}$, $\overline{OR} \perp \overline{OQ}$, and $m\angle POQ = 40$. Find $m\angle NOR$.



4. The measures of two supplementary angles are in the ratio 5:7.

   Find the measure of the smaller angle.

5. The measure of the complement of an angle is 18 less than twice the measure of the angle. What is the numerical measure of the angle?

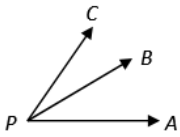
6. If $\overline{ET}$ bisects $\angle BEG$, $m\angle BET = x^2$ and $m\angle GET = 5x + 14$, find the numerical measure of $\angle BEG$.

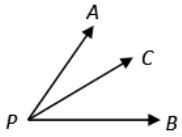
7. If $\overline{OY}$ bisects $\angle BOT$, $m\angle BOY = 3x + 8$ and $m\angle BOT = 8x - 2$, find the numerical measure of $\angle TOY$.

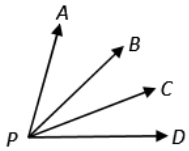
READ: Remember from the last assignment: Numbers can always be added and subtracted. It makes no sense to add or subtract people. Line segments can *sometimes* be added or subtracted (if you don't remember when, review the note after homework IP – 1 #5). Angles are like segments. They can *sometimes* be added and subtracted. Remember, $\angle ABC$ represents an actual angle (a geometric object); $m\angle ABC$ is a *number* that represents the degree measure of $\angle ABC$.

Your answers to #8 should have been "Yes" for all except parts *b* and *f*.

1) Adding two angles only makes sense if they are adjacent: they share a vertex and one side but have no interior points in common (one is not "inside" the other).







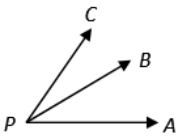
$\angle APB + \angle BPC = \angle APC$

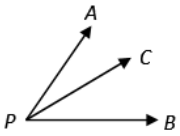
$\angle APB + \angle BPC$ = nonsense

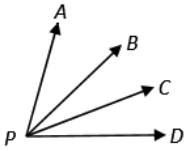
$\angle APB + \angle CPD$ = nonsense

$\angle APC + \angle BPD$ = nonsense

2) Subtracting two angles only makes sense if they share a vertex and one side and the second side of the smaller angle is on the interior of the larger angle (the smaller angle is part of the larger angle).







$\angle APC - \angle BPC = \angle APB$

$\angle APC - \angle APB = \angle BPC$

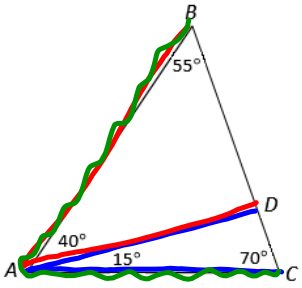
$\angle BPC - \angle APC$ = nonsense

$\angle APC - \angle BPD$ = nonsense

$\angle APD - \angle BPC$ = nonsense

#s

8. Based on the diagram at right, tell if each of the following is True or False. Remember the difference between $\angle A$ and $m\angle A$.



15 + 55 = 70

T a. $m\angle CAD + m\angle ABC = m\angle BCA$

F b. $\angle CAD + \angle ABC = \angle BCA$

c. $m\angle CAD + m\angle DAB = m\angle CAB$

T d. $\angle CAD + \angle DAB = \angle CAB$

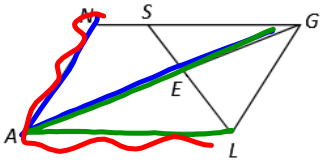
e. $m\angle DBA - m\angle DAC = m\angle BAD$

f. $\angle DBA - \angle DAC = \angle BAD$

g. $m\angle BAC - m\angle BAD = m\angle DAC$

h. $\angle BAC - \angle BAD = \angle DAC$

9. Use the diagram at right to fill in an appropriate angle for each of the following or write "nonsense."



a. $\angle NAG + \angle LAG =$ $\angle NAL$

b. $\angle SEG + \angle AEL =$ _____

c. $\angle ANS + \angle NSE =$ _____

d. $\angle LGS - \angle EGS =$ _____

e. $\angle NSE - \angle ESG =$ _____

f. $\angle ALG - \angle ALE =$ _____

g. $\angle LGS + \angle EGS =$ _____

h. $\angle LSN - \angle LEA =$ _____