

Name: _____

Date: _____

Geometry Notes Intro to Geo Proofs - 2: Angles

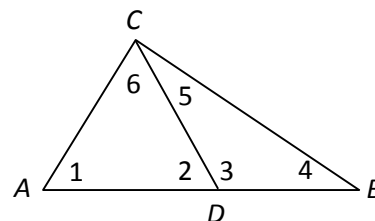
Definitions (continued)

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

NOTE: Angles may be named in three ways.

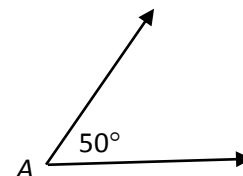
1. By three letters, with the middle letter at the vertex,
2. (Sometimes) by a single letter at the vertex (**only if there is no chance of confusion**),
3. By a number or lower case letter placed inside the angle near the vertex.

Ex: In the diagram at right,



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

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



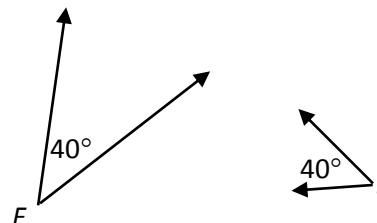
Acute angle:

Right angle:

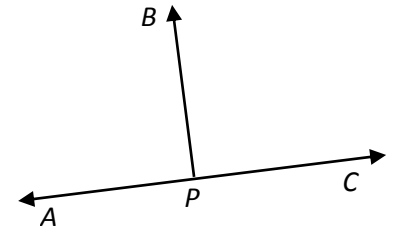
Obtuse angle:

Straight angle:

Congruent angles: Two angles that have the same measure.



Perpendicular segments (or lines or rays)



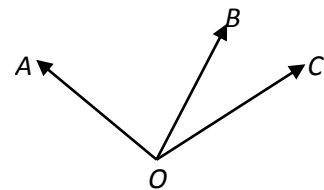
Ex: Given \overrightarrow{APC} and \overrightarrow{BP} , $m\angle APB = 3x + 20$ and $m\angle CPB = 5(x - 2)$. Determine if $\overrightarrow{PB} \perp \overrightarrow{APC}$.

Two angles are **complementary** if their measures

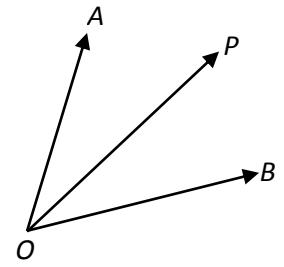
Two angles are **supplementary** if their measures

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

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



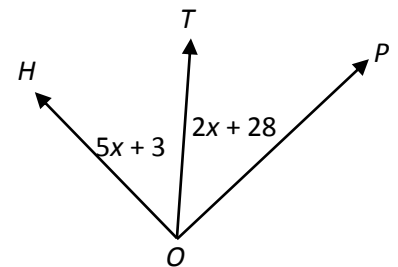
Angle bisector: A ray that divides an angle into two congruent angles.



Postulate: Every angle has exactly one bisector.

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

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



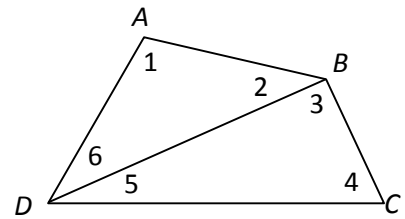
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Geometry Homework: Intro Geo Proofs - 2

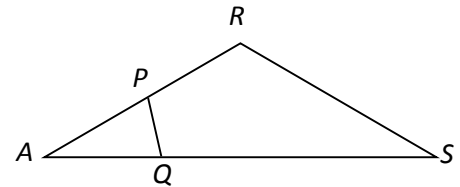
1. Use the diagram at right to answer the following.

- How many angles in the diagram have their vertex at A ?
- How many angles in the diagram have their vertex at B ?
- What angle (number) is named $\angle BDC$?
- Name two adjacent angles in the diagram.
- Are $\angle ADC$ and $\angle BDC$ adjacent?
- Give three alternate names for $\angle 4$.

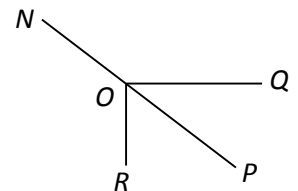


- Explain why we should *not* refer to $\angle D$ in the diagram. (Yes, you may lose points for sloppy notation on quizzes and tests.)
- Name one acute angle on the diagram.
- Name one obtuse angle on the diagram.
- Which angle on the diagram appears to be closest to a right angle?

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 $m\angle NOR$.

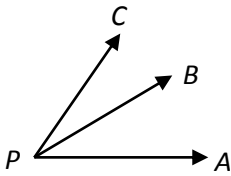


4. The measures of two supplementary angles are in the ratio 5:7.
Find the measure of the smaller angle.
5. The measure of the complement of an angle is 18 less than twice the measure of the angle. What is the numerical measure of the angle?
6. If \overline{ET} bisects $\angle BEG$, $m\angle BET = x^2$ 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 $\angle TOY$.

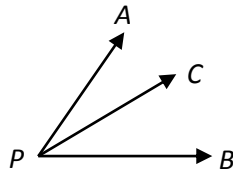
READ: Remember from the last assignment: Numbers can always be added and subtracted. It makes no sense to add or subtract people. Line segments can *sometimes* be added or subtracted (if you don't remember when, review the note after homework IP – 1 #5). Angles are like segments. They can *sometimes* 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*.

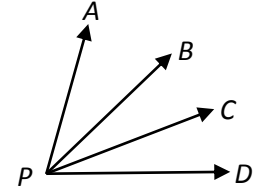
- 1) Adding two angles only makes sense if they are adjacent: they share a vertex and one side but have no interior points in common (one is not “inside” the other).



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



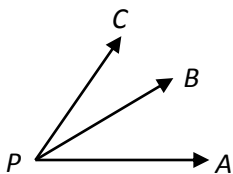
$$\angle APB + \angle BPC = \text{nonsense}$$



$$\angle APB + \angle CPD = \text{nonsense}$$

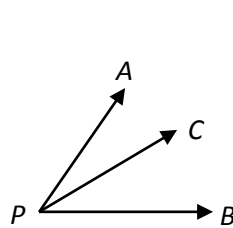
$$\angle APC + \angle BPD = \text{nonsense}$$

- 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).

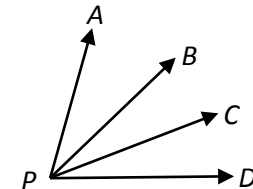


$$\angle APC - \angle BPC = \angle APB$$

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



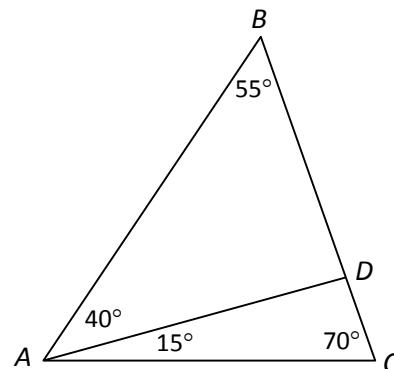
$$\angle BPC - \angle APC = \text{nonsense}$$



$$\angle APC - \angle BPD = \text{nonsense}$$

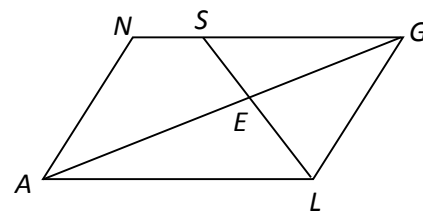
$$\angle APD - \angle BPC = \text{nonsense}$$

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



- a. $m\angle CAD + m\angle ABC = m\angle BCA$
- b. $\angle CAD + \angle ABC = \angle BCA$
- c. $m\angle CAD + m\angle DAB = m\angle CAB$
- 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. $\angle NAG + \angle LAG =$ _____
- 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. $\angle LSN - \angle LEA =$ _____