HW #1 (submitted Friday, 11/7)

- Read Ch 1 & Ch 2
- **Ch 1 Review Problems pp. 36-38**
- Start working on Geometry badge on Khan Academy; make sure you've added me as a coach using code listed on brewermath.com!

Quiz #1 - TODAY! 11/12

- Vocab
- Fill in the blank proofs

HW #2 **(due Friday, 11/14)**

- Read Ch 3 & Ch 4
- **Ch 2 Review Problems pp. 71-74**
- **Ch 3 Review Problems pp. 124-128**
- Khan Academy exercises:"Introduction to Euclidean geometry""Angles and intersecting lines"

Upcoming:
Test #1 (Chapters 1-4) - Wednesday, 11/19 ?

3.4 – Bisection

Def: A point is on the midpoint of a line segment iff it divides the line segment into two equal segments.

Def: A line bisects an angle iff it divides the angle into two equal angles.

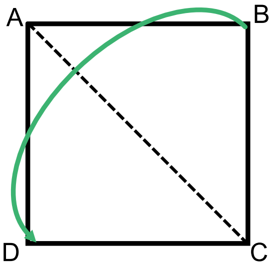
Def: Two objects are congruent if and only if they coincide exactly when superimposed.

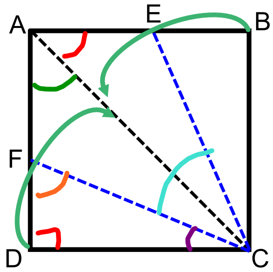
Def: A corollary is a theorem that can be easily proved as a consequence of a postulate or another theorem.

Corollary to the Ruler Postulate: A line segment has exactly one midpoint.

Corollary to the Protractor Postulate: An angle has exactly one ray that bisects it.

Bisecting angles with origami: Starting with a square sheet of paper, corner B is folded onto D. Then sides BC and DC are folded onto the fold AC.





Because ∠BAC fits onto ∠DAC, ∠BAC and ∠DAC are congruent.

17. Which angle is bisected if ∠BAC=∠DAC?

∠DAB

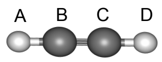
18. Name three more angles that are bisected in the folding process.

∠DCA , ∠DCB , ∠BCA

Angle BCD is a right angle because the process starts with a square. Find the number of degrees in each of the following angles.

20. ∠FCD $22.5°$ 21. ∠FCE $45°$ 23. ∠DFC $180° - 90° - 22.5°$ $67.5°$

Acetylene molecules contain four atoms, arranged linearly.



34. In this molecule, AB=CD, A-B-C and B-C-D. Use these facts to supply the reasons in the following direct proof that AC=BD.

Proof:

Statements	Reasons
AB=CD	Given / hypothesis
AB+BC=BC+CD	Addition
A-B-C and B-C-D	Given
AB+BC=AC and BC+CD=BD	Betweenness of Points Theorem
Therefore, AC=BD	Substitution

35. Use the additional fact that AC>2AB to supply the missing statements and reasons in this indirect proof that B is *not* the midpoint of AC.

Proof:

Statements	Reasons
Suppose B is the midpoint of AC	Assumption
If B is the midpoint of AC, then AB=BC.	definition of midpoint
Because AB+BC=AC, 2AB=AC.	substitution
which contradicts AC > 2AB	Hypothesis
Therefore, our assumption is false and B is <u>not</u> the midpoint of AC.	follows from contradiction

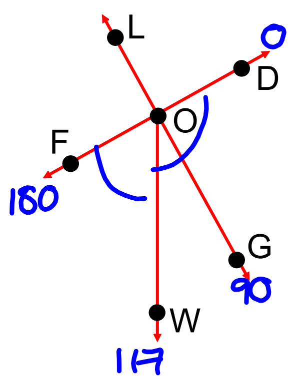
3.5 – Complementary and Supplementary Angles

Def: Two angles are complementary iff their sum is 90°.

Def: Two angles are supplementary iff their sum is 180°.

Theorem 3: Complements of the same angle are equal. (proved on p.106)

Theorem 4: Supplements of the same angle are equal.



If a protractor is placed on the figure so that OD has coordinate 0, the coordinates of the other rays are: OG, 90; OW, 117; OF, 180.

16. Write the equation that follows from the fact that OD-OW-OF.

$\angle DOW + \angle WOF = \angle DOF$

(betweenness of rays theorem)

17. Find the measures of ∠DOW 117°

∠WOF 63°

∠DOF 180°

18. What relation does ∠DOW have to ∠WOF?

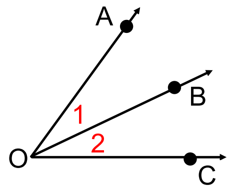
Supplementary (sum to 180°)

19. Find the measure of ∠WOG

27°

20. What relation does ∠WOG have to ∠WOF?

Complementary (sum to 90°)



$\angle 1 + \angle AOC = 90°$

$\angle 2 + \angle AOC = 90°$

In the figure, ∠1 and ∠2 are both complements of ∠AOC.

44. What else is true? assuming figure drawn to scale, all ∠'s are acute

$\angle 1 = \angle 2$ (Thm 3)

$\angle 1 = \angle 2 \Rightarrow \overline{OB}$ is a bisector of $\angle AOC$

$\angle 1 + \angle 2 = \angle AOC$ (Betweenness of Rays Theorem)

$\angle 1 + \angle AOC = 90°$ & $\angle 2 + \angle AOC = 90°$

$\underline{\angle 1}+\angle 2+\angle 2 = \underline{\angle AOC + \angle 2}$ (addition)

$\angle 2 + \angle 2 + \angle 2 = 90°$ (substitution)

$3 \cdot \angle 2 = 90°$

$\angle 2 = 30°$ (division)

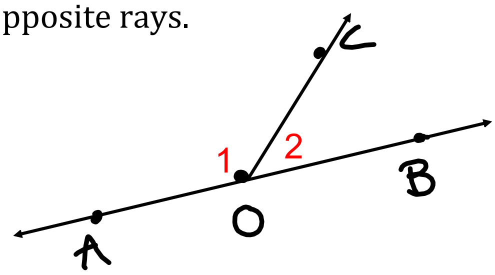
45. Is it possible to figure out the size of each angle in the figure without measuring them?

$\angle 1 = \angle 2 = 30°$

$\angle AOC = 60°$

<u>3.6 – Linear Pairs and Vertical Angles</u>

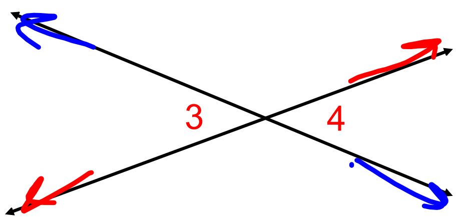
Def: Two angles are a <u>linear pair</u> iff they have a common side and their other sides are opposite rays.



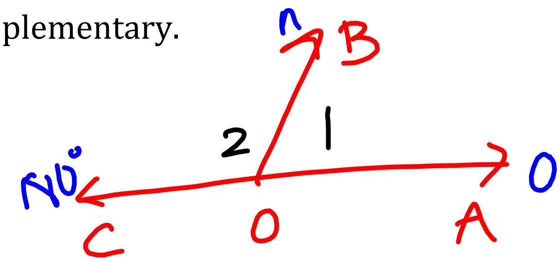
$\overrightarrow{OA}$ & $\overrightarrow{OB}$ opposite rays

$\overrightarrow{OC}$ common side

Def: Two angles are <u>vertical angles</u> iff the sides of one angle are opposite rays to the sides of the other.



Theorem 5: The angles in a linear pair are supplementary.



Given: ∠1 and ∠2 are a linear pair.

Prove: ∠1 and ∠2 are supplementary.

Proof:

Statements	**Reasons**
1. ∠1 and ∠2 are a linear pair.	Given
2. Rays OA and OC are opposite rays.	If two angles are a linear pair, they have a common side and their other sides are opposite rays. (def. of linear pair)
3. Let the coordinates of OA, OB, and OC be 0, n, and 180.	Protractor Postulate
4. ∠1=n-0=n° and ∠2=(180-n)°	Protractor Postulate
5. ∠1+∠2= n°+(180-n)°= 180°	Addition & Substitution
6. ∠1 and ∠2 are supplementary.	Two angles are supplementary if their sum is 180°.

Theorem 6: Vertical angles are equal.

3.7 – Perpendicular and Parallel Lines

Def: Two lines are perpendicular iff they form a right angle.

Theorem 7: Perpendicular lines form four right angles.

Corollary to the definition of a right angle: All right angles are equal.

Theorem 8: If the angles in a linear pair are equal, then their sides are perpendicular.

Def: Two lines are parallel iff they lie in the same plane and do not intersect.