Thursday, August 30, 2012

T.I.S.K. Problems

1) Evaluate: $3-(9-18)^2$
2) Write with positive exponents: $x^{-5}(x^4)$
3) Find 8% of 32.

We will have NO mental math questions today.

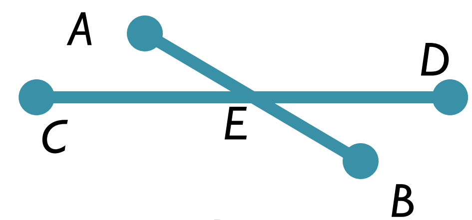
Homework: p. 111-113 Complete #15-26 mentally; complete #27-31 odd, 34 & 35 in writing

Homework Check

22) Given: $AB = CD$

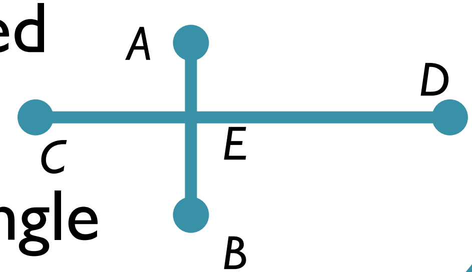
Prove: $\overline{AB} \cong \overline{CD}$

24) Given: $\overline{AB}$ intersects $\overline{CD}$ at E.



Prove: 4 angles are formed

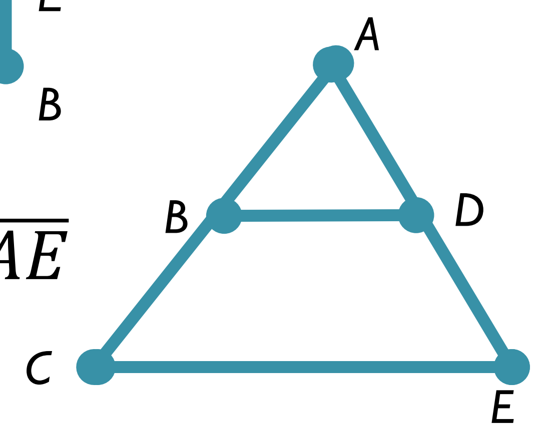
26) Given: $\overline{AB} \perp \overline{CD}$



Prove: $\measuredangle AED$ is a right angle

28) Given: B is the midpoint of $\overline{AC}$

and D is the midpoint of $\overline{AE}$



Prove: $BD = \frac{1}{2} CE$

30, 33 & 34) (Next slide)

Homework Check

30)

Statement	Reason
1) $AC = BD$	1) Given
2) $AC = AB + BC$, $BD = BC + CD$	2) Segment addition postulate
3) $AB + BC = BC + CD$	3) Substitution property of equality
4) $AB = CD$	4) Subtraction property of equality

33)

Statement	Reason
1) $NL = NM, AL = BM$	1) Given
2) $NL = NA + AL$, $NM = NB + BM$	2) Segment addition postulate
3) $NA + AL = NB + BM$	3) Substitution property of equality
4) $NA + BM = NB + BM$	4) Substitution property of equality
5) $NA = NB$	5) Subtraction property of equality

Homework Check

34)

Statement	Reason
1) $\overline{GR} \cong \overline{IL}, \overline{SR} \cong \overline{SL}$	1) Given
2) $GR = IL, SR = SL$	2) Def. $\cong$ segments
3) $GR = GS + SR,$ $IL = IS + SL$	3) Segment Addition Property
4) $GS + SR = IS + SL$	4) Substitution property of equality
5) $GS + SL = IS + SL$	5) Substitution property of equality
6) $GS = IS$	6) Subtraction property of equality
7) $\overline{GS} \cong \overline{IS}$	7) Def. $\cong$ segments

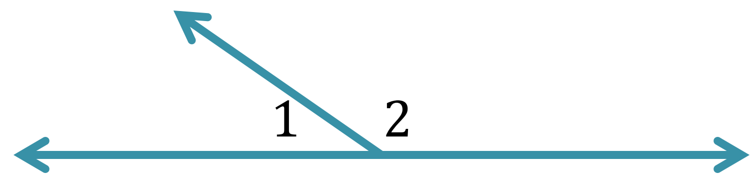
§2-6 Verifying Angle Relationships

- All definitions are ***biconditional***.
  - Biconditional:
    The statement and its converse are both true.
- Example:
  - Definition of a Right Angle:
    - Right angles have a measure of $90°$.
      - If an angle is right, then it has a measure of $90°$.
      - If an angle has a measure of $90°$, then it is right.
      - BICONDITIONAL: An angle is a right angle if and only if its measure is $90°$.
- Biconditionals have special symbols:
  - "if and only if" can be written as "iff" or $\Leftrightarrow$

§2-6 Verifying Angle Relationships

- Given: $\measuredangle 1$ and $\measuredangle 2$ are a linear pair.
- Prove: $\measuredangle 1$ and $\measuredangle 2$ are supplementary.

Step 1: Draw a Picture!



Step 2: Make a plan!

What sort of definitions, theorems, postulates, etc. do I have that deal with Linear Pairs (given) or supplementary angles (goal)?

Linear Pair Postulate:

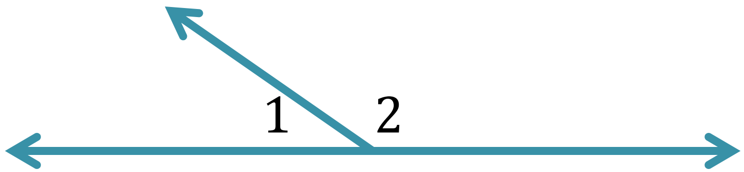
If two angles form a linear pair then the sum of their measures is 180°.

Definition of Supplementary:

2 angles are supplementary iff the sum of their measures is 180°.

§2-6 Verifying Angle Relationships

- Given: $\measuredangle 1$ and $\measuredangle 2$ are a linear pair.
- Prove: $\measuredangle 1$ and $\measuredangle 2$ are supplementary.



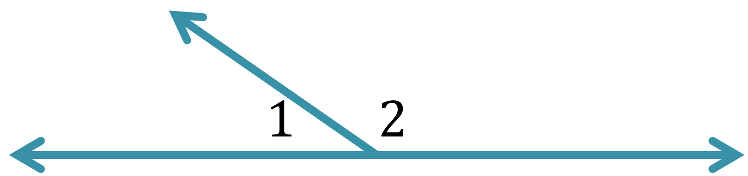
$\therefore$ to prove two angles are supplementary, I have to prove they have a sum of $180°$.

Definition of Supplementary:

If the measures of two angles have a sum of $180°$ then the angles are supplementary.

§2-6 Verifying Angle Relationships

- Given: $\measuredangle 1$ and $\measuredangle 2$ are a linear pair.
- Prove: $\measuredangle 1$ and $\measuredangle 2$ are supplementary.



Statements	**Reasons**
1. $\measuredangle 1$ and $\measuredangle 2$ are a linear pair	1. Given
2. $m\measuredangle 1 + m\measuredangle 2 = 180°$	2. If two angles form a linear pair, then the sum of their measures is 180° (Linear Pair Postulate)
3. $\measuredangle 1$and $\measuredangle 2$ are supplementary	3. If the sum of the measures of two angles is 180°, then the angles are supplementary. (def. Supplementary)

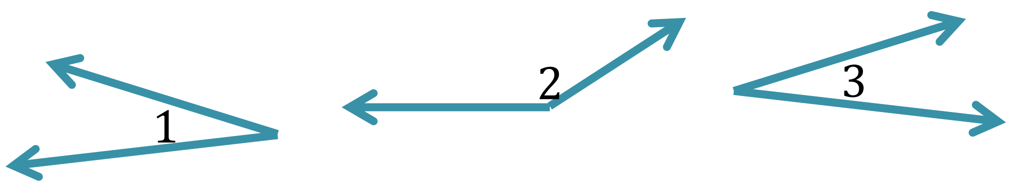
You have just proven the ***Supplement Theorem:***
If two angles form a linear pair, then they are supplementary angles.

Congruence Theorems

- Congruence of angles is
  - Reflexive
    - For any angle, $\measuredangle A$: $\measuredangle A \cong \measuredangle A$
  - Symmetric
    - If $\measuredangle A \cong \measuredangle B$ then $\measuredangle B \cong \measuredangle A$.
  - Transitive
    - If $\measuredangle A \cong \measuredangle B$ and $\measuredangle B \cong \measuredangle C$, then $\measuredangle A \cong \measuredangle C$.

Congruent Supplements Theorem

- Given: $\measuredangle 1$ and $\measuredangle 2$ are supplementary
  and $\measuredangle 2$ and $\measuredangle 3$ are supplementary
- Prove: $\measuredangle 1 \cong \measuredangle 3$

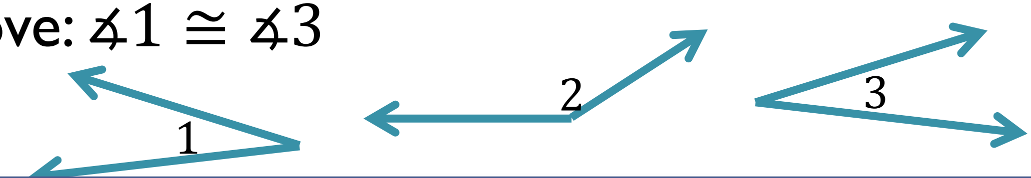


To prove angles are congruent, we must prove that they have the same measures.

I know that the sum of the measures of supplementary angles is $180°$.

Congruent Supplements Theorem

- Given: $\measuredangle 1$ and $\measuredangle 2$ are supplementary
  and $\measuredangle 2$ and $\measuredangle 3$ are supplementary
- Prove: $\measuredangle 1 \cong \measuredangle 3$



Congruent Supplements Theorem: If two angles are supplementary to the same angle (or congruent angles) then they are congruent.

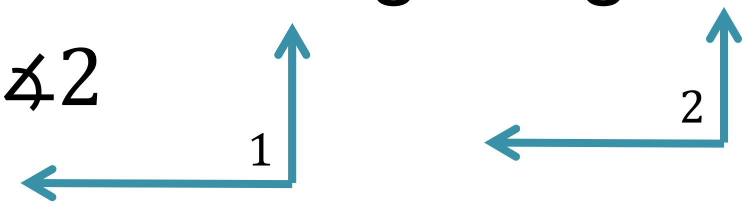
1) $\measuredangle 1$ and $\measuredangle 2$ are supplementary $\measuredangle 2$ and $\measuredangle 3$ are supplementary	1) Given
2) $m\measuredangle 1 + m\measuredangle 2 = 180°$ and $m\measuredangle 2 + m\measuredangle 3 = 180°$	2) If two angles are supplementary, then the sum of their measures is 180°. (Def. Supp. $\measuredangle$s)
3) $m\measuredangle 1 = 180° - m\measuredangle 2$ $m\measuredangle 3 = 180° - m\measuredangle 2$	3) If $a = b$ then $a - c = b - c$. (- prop. of =)
4) $m\measuredangle 1 = m\measuredangle 3$	4) If $a = b$ and $b = c$ then $a = c$. (Transitive prop.)
5) $\measuredangle 1 \cong \measuredangle 3$	5) If 2 $\measuredangle$s have = measures, then they're $\cong$ (def. $\cong$)

Congruent Complements Theorem

- Can you prove the Congruent Complements Theorem?
  - If two angles are complementary to the same angle (or congruent angles) then they are congruent.
    - Given: $\measuredangle 1$ is complementary to $\measuredangle 3$
      $\measuredangle 2$ is complementary to $\measuredangle 4$
      $\measuredangle 3 \cong \measuredangle 4$
    - Prove: $\measuredangle 1 \cong \measuredangle 2$
  - Try it now with your seat-partner.

Right Angle Theorem

- Given: $\measuredangle 1$ and $\measuredangle 2$ are right angles
- Prove: $\measuredangle 1 \cong \measuredangle 2$



Statement	Reason
1) $\measuredangle 1$ and $\measuredangle 2$ are right angles	1) Given
2) $m\measuredangle 1 = 90°$ and $m\measuredangle 2 = 90°$	2) If an angle is a right angle, then its measure is 90°. (def. right angles)
3) $m\measuredangle 1 = m\measuredangle 2$	3) If $a = b$ and $b = c$ then, $a = c$. (Transitive prop.)
4) $\measuredangle 1 \cong \measuredangle 2$	4) If 2 $\measuredangle$s have = measures, then they're $\cong$ (def. $\cong$)

Right Angle Theorem

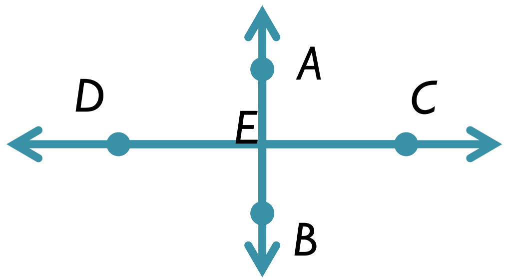
If 2 (or more) angles are right angles then they are congruent.

Prove the Vertical Angle Theorem

- If two angles are vertical angles, then they are congruent.

One More Theorem

- Given: $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are perpendicular (⊥) lines that intersect at point *E*.
- Prove: $\measuredangle AEC, \measuredangle BEC, \measuredangle BED, \text{and} \measuredangle AED$ are right angles.

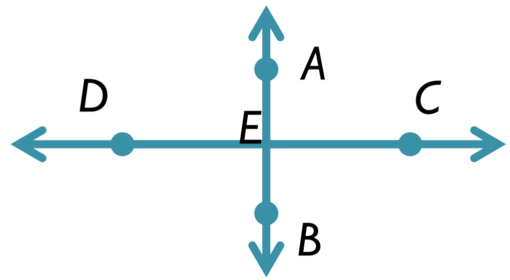


We will need to use a definition:
DEF: Perpendicular (⊥) lines:
If two lines intersect to form a right angle, then they are perpendicular.
If two lines are perpendicular, then they intersect to form a right angle.

We also use the Vertical Angle Theorem:
If two angles are vertical angles, then they are congruent.

One More Theorem

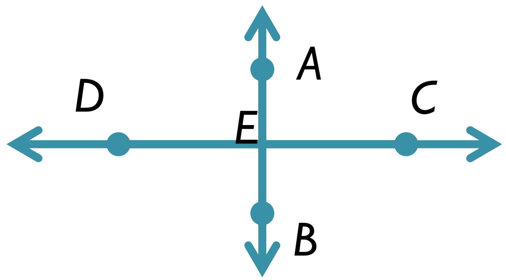
- Given: $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are perpendicular ($\perp$) lines that intersect at point *E*.
- Prove: $\measuredangle AEC, \measuredangle BEC, \measuredangle BED, \text{and} \measuredangle AED$ are right angles.



Statement	Reason
1) $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are $\perp$	1) Given
2) $\measuredangle AEC$ is a right $\measuredangle$.	2) If two lines are $\perp$ then they form a right $\measuredangle$.
3) $m\measuredangle AEC = 90°$	3) If an $\measuredangle$ is right, then its measure = $90°$.
4) $\measuredangle AEC$ & $\measuredangle BED$ are vertical $\measuredangle$s. $\measuredangle AED$ & $\measuredangle BEC$ are vertical $\measuredangle$s.	4) If two angles share a vertex and their sides form opposite rays, they are vertical $\measuredangle$s.
5) $\measuredangle AEC \cong \measuredangle BED, \measuredangle BEC \cong \measuredangle \text{AED}$	5) If two angles are vertical $\measuredangle$s, then they're $\cong$.
6) $m\measuredangle AEC = m\measuredangle BED$, $m\measuredangle BEC = m\measuredangle \text{AED}$	6) If 2 $\measuredangle$s are $\cong$ then they have = measures.

One More Theorem

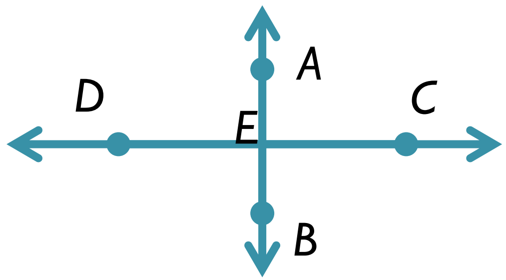
- Given: $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are perpendicular (⊥) lines that intersect at point *E*.
- Prove: $\measuredangle AEC, \measuredangle BEC, \measuredangle BED,$ and $\measuredangle AED$ are right angles.



Statement	Reason
6) $m\measuredangle AEC = m\measuredangle BED$, $m\measuredangle BEC = m\measuredangle \mathrm{AED}$	6) If 2 $\measuredangle$s are ≅ then they have = measures.
7) $\measuredangle AEC$ and $\measuredangle AED$ are a linear pair	7) If 2 $\measuredangle$s are adjacent and their noncommon sides form a line, then they are a linear pair.
8) $\measuredangle AEC$ and $\measuredangle AED$ are supp.	8) If 2 $\measuredangle$s form a linear pair, then they're supp.
9) $m\measuredangle AEC + m\measuredangle AED = 180°$	9) If 2 $\measuredangle$s are supp., then the sum of their measures is 180°
10) $90° + m\measuredangle AED = 180°$	10) If *a* = *b*, then *a* can be substituted for *b* in any equation.
11) $m\measuredangle AED = 90°$	11) If *a* = *b* then *a* – *c* = *b* – *c*.

One More Theorem

- Given: $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are perpendicular (⊥) lines that intersect at point *E*.
- Prove: $\measuredangle AEC, \measuredangle BEC, \measuredangle BED,$ and $\measuredangle AED$ are right angles.



Statement	Reason
11) $m\measuredangle AED = 90°$	11) If *a* = *b* then *a* – *c* = *b* – *c*.
12) $m\measuredangle AED = m\measuredangle CEB = 90°$ $m\measuredangle AED = m\measuredangle CEB = 90°$	12) If *a* = *b* and *b* = *c*, then *a* = *c*.
13) $\measuredangle AED,\ \measuredangle AED,\ \measuredangle BEC,$ & $\measuredangle BED$ are right angles.	13) If the $m\measuredangle = 90°$, then it is a right angle.

Theorem:
Perpendicular lines intersect to form four right angles.

Homework

- p. 111-113 Complete #15-26 mentally; complete #27-31 odd, 34 & 35 in writing