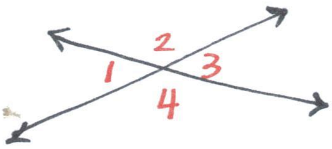
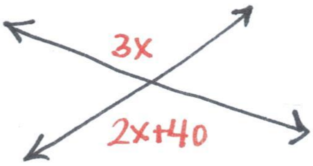
Proving Angles Congruent (Section 6-2)

* Vertical Angle Theorem: vertical angles are $\cong$ (congruent).



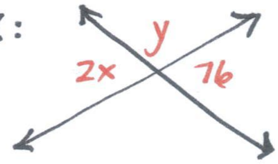
so... $\angle 1 \cong \angle 3$
$\angle 2 \cong \angle 4$

Got it?
ex:



so... $3x = 2x+40$
$-2x \quad -2x$
$\boxed{x = 40}$

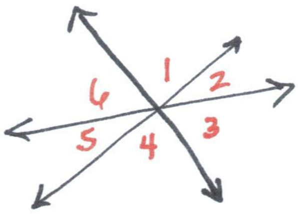
#1
ex:



$2x = 76$
$\boxed{x = 38}$

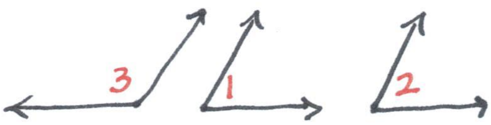
$76 + y = 180$
$\boxed{y = 104}$

#3
ex: Given: $\angle 1 \cong \angle 3$
Prove: $\angle 6 \cong \angle 4$



Statements	Reasons
$\angle 1 \cong \angle 3$	Given
$\angle 3 \cong \angle 6$	Vertical Angles
$\angle 1 \cong \angle 6$	Transitive Property
$\angle 4 \cong \angle 1$	Vertical Angles
$\angle 6 \cong \angle 4$	Transitive Prop

* Congruent Supplements Theorem: If $\angle 1$ & $\angle 3$ are supplements and $\angle 2$ & $\angle 3$ are supplements, then $\angle 1 \cong \angle 2$.



#4 Given:
ex: $\angle 1$ & $\angle 2$ are complementary & $\angle 3$ & $\angle 2$ are complementary.
Prove: $\angle 1 \cong \angle 3$

Paragraph Proof: $\angle 1$ & $\angle 2$ are compl and $\angle 3$ & 2 are compl. because it's given. Then $m\angle 1 + m\angle 2 =$ 90 and $m\angle 3 + m\angle 2 =$ 90. Then $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$ by Trans. prop. So by the Subtraction prop $m\angle 1 = m\angle 3$ and angles w/ same measure are congruents, so $\angle 1 \cong \angle 3$.

* Congruent Complements Theorem: If $\angle 1$ & $\angle 2$ are complements and $\angle 3$ & $\angle 2$ are complements, then $\angle 1 \cong \angle 3$.

* Right Angle Theorem: all right angles are congruent.

* Congruent & Supplementary: If $\angle 1 \cong \angle 2$ and $\angle 1$ & $\angle 2$ are supplements, then $m\angle 1 = m\angle 2 = 90$.

#14

ex: given: $\angle X$ & $\angle Y$ are right angles.

Prove: $\angle X \cong \angle Y$

$\angle X$ & $\angle Y$ are right angles because it's given. By definition of Right Angles, $m\angle X = 90$ & $m\angle Y = 90$. By transitive property, $m\angle X = m\angle Y$. Because angles of equal measure are congruent, $\angle X \cong \angle Y$.

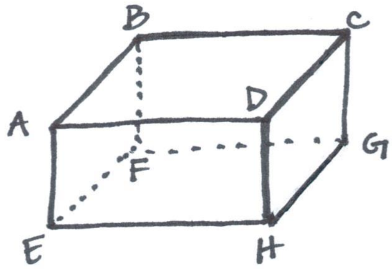
Lines & Angles (Section 6-3)

* Parallel Lines (//) are coplanar lines that <u>do not</u> intersect.

Skew Lines are non-coplanar. They are not // & <u>do</u> <u>not</u> intersect.

Parallel Planes are planes that <u>do</u> <u>not</u> intersect.

Got it?
ex:



a) which segments are // to $\overline{AD}$? $\overline{EH}$, $\overline{BC}$, $\overline{FG}$

b) why are $\overline{FE}$ & $\overline{CD}$ NOT skew? they are coplanar (plane FEDC)

c) what is another pair of // planes?
plane BCC // plane ADH

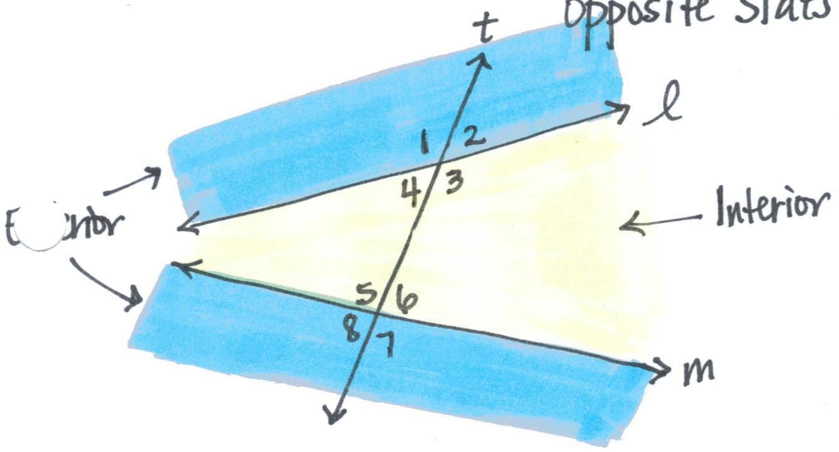
d) what two segments are // to plane DCGH?
$\overline{AB}$, $\overline{BF}$, $\overline{EF}$, $\overline{AE}$

* Alternate Interior Angles: non-adjacent interior angles that lie on opposite sides of the transversal
$\angle 4$ & $\angle 6$
$\angle 3$ & $\angle 5$

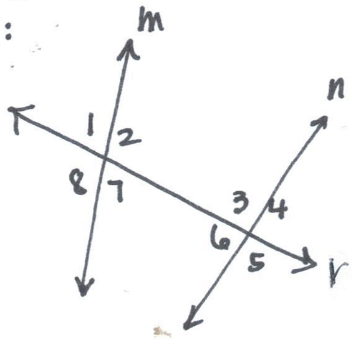
Same-side Interior Angles: interior angles on the same side of the transversal.
$\angle 4$ & $\angle 5$
$\angle 3$ & $\angle 6$

Corresponding Angles: lie on the same side of the transversal & corresponding positions.
$\angle 1$ & $\angle 5$
$\angle 4$ & $\angle 8$
$\angle 2$ & $\angle 6$ $\angle 3$ & $\angle 7$

Alternate Exterior Angles: non-adjacent exterior angles that lie on opposite sides of the transversal.
$\angle 1$ & $\angle 7$
$\angle 2$ & $\angle 8$



Got it?
ex:



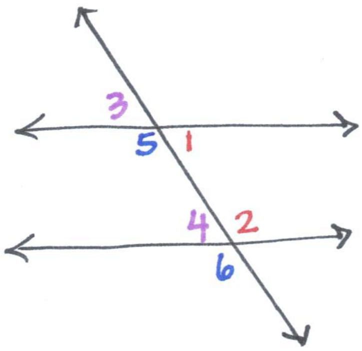
Corresp. angles: $\angle 1$ & $\angle 3$, $\angle 2$ & $\angle 4$, $\angle 8$ & $\angle 6$, $\angle 7$ & $\angle 5$.

same-side interior: $\angle 2$ & $\angle 3$, $\angle 7$ & $\angle 6$.

alt. exterior: $\angle 1$ & $\angle 5$, $\angle 4$ & $\angle 8$

alt interior: $\angle 2$ & $\angle 6$, $\angle 3$ & $\angle 7$

#5
ex:



$\angle 1$ & $\angle 2$: same-side int.
$\angle 3$ & $\angle 4$: corresp. angles
$\angle 5$ & $\angle 6$: corresp angles.