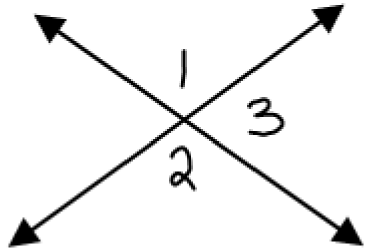
Warm↑: Given: $\angle 1$ and $\angle 2$ are vertical $\angle s$

Prove: $\angle 1 \cong \angle 2$



Think-pair-share!

Paragraph Proof: Let $\angle 1 = x$ and label $\angle 3$ on the diagram. $\angle 3 = 180 - x$ because of the subtraction prop. of $\angle s$ (sub. x from a straight $\angle$). Now $\angle 2 = 180 - \angle 3$, same reason as above.

$$\angle 2 = 180 - (180 - x) \quad \text{substitution}$$
$$= \cancel{180} - \cancel{180} + x \quad \text{simplify}$$
$$= x.$$

$\therefore$ $\angle 1 = x = \angle 2$ $\quad\therefore$ $\angle 1 \cong \angle 2$ b/c if two $\angle$'s have the same measure then they are $\cong$.

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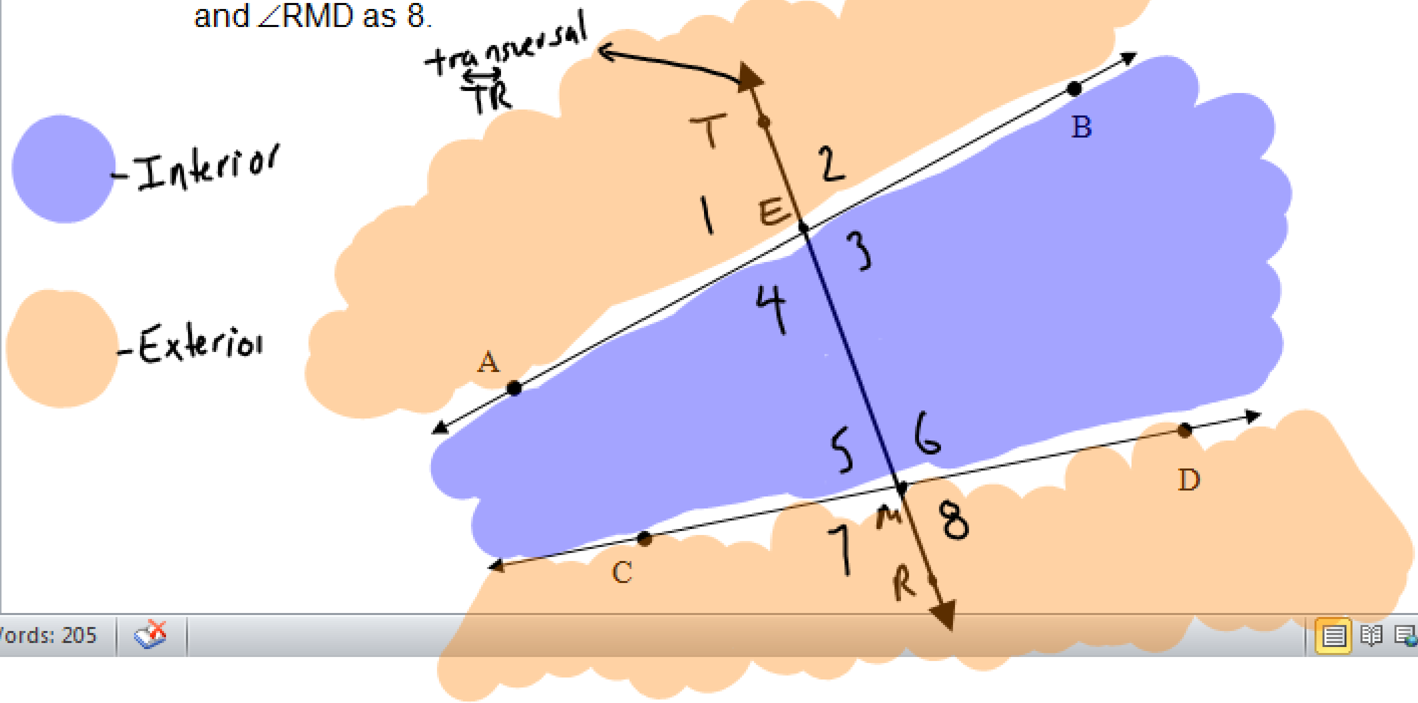
4.5/5.3 Honors Geometry DATE: ____________

Target 1C. Prove theorems about lines and angles with statements based on the Law of Syllogism.

- ☑ Shade the area between the lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ __Blue__ and the area outside the lines __Orang__.
- ☑ Draw a line that intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$. Label that line $\overleftrightarrow{TR}$ (transversal).
- ☑ Where $\overleftrightarrow{TR}$ intersects $\overleftrightarrow{AB}$, label this point E. Where $\overleftrightarrow{TR}$ intersects $\overleftrightarrow{CD}$, label this point M.
- ☑ Label ∠TEA as 1, ∠TEB as 2, ∠BEM as 3, ∠AEM as 4, ∠CME as 5, ∠EMD as 6, ∠CMR as 7, and ∠RMD as 8.



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Angle Relationship	Definition	Examples
Corresponding Angles	Two angles that are in the same location.	4 pairs: $\angle 1, \angle 5$ $\angle 4, \angle 7$ $\angle 2, \angle 6$ $\angle 3, \angle 8$
Alternate Interior Angles	Two angles in between the two lines(in the interior) that are on opposite (alternate) sides of the transversal	2 pairs: $\angle 3, \angle 5$ $\angle 4, \angle 6$
Alternate Exterior Angles	Two angles outside the two lines(in the exterior) that are on opposite (alternate) sides of the transversal	2 pairs: $\angle 1, \angle 8$ $\angle 2, \angle 7$
Same-Side Interior Angles	Two angles in between the two lines(in the interior) that are the same side of the transversal	2 pairs: $\angle 4, \angle 5$ $\angle 3, \angle 6$
Same-Side Exterior Angles	Two angles outside the two lines(in the exterior) that are on the same side of the transversal	2 pairs: $\angle 1, \angle 7$ $\angle 2, \angle 8$

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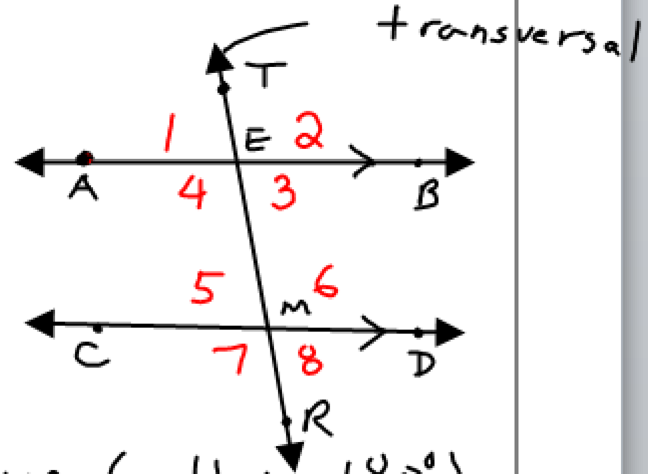
that are on the same side of the transversal

What would happen to each angle relationship above if we made $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$? Let's explore this on the Nspire.

When lines are $\parallel \Longrightarrow$



Corr ← 1) Corresponding $\angle$s $\cong$
($\angle 1, \angle 5$; $\angle 2, \angle 6$; $\angle 4, \angle 7$; $\angle 3, \angle 8$)

A.I. ← 2) Alternate Interior $\angle$s $\cong$
($\angle 4, \angle 6$; $\angle 3, \angle 5$)

A.E. ← 3) Alternate Exterior $\angle$s $\cong$
($\angle 1, \angle 8$; $\angle 2, \angle 7$)

S.S.I ← 4) Same-side Interior $\angle$s supp. (add to $180°$)
($\angle 4, \angle 5$; $\angle 3, \angle 6$)

S.S.E. ← 5) Same-side Exterior $\angle$s supp (— || —)
($\angle 1, \angle 7$; $\angle 2, \angle 8$)

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