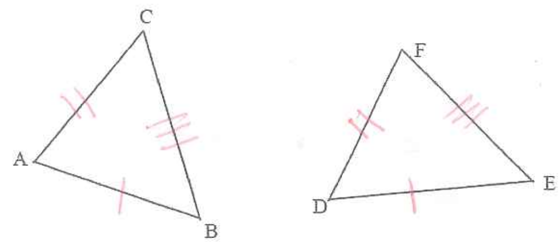
Name: ANSWERS Period: _____ Date: _______

Geometry 21: Practice with Indirect Proofs #2

1. Given: $\overline{AC} \cong \overline{DF}$
$\overline{BC} \cong \overline{EF}$
$\angle C \ncong \angle F$

Prove: $\overline{AB} \ncong \overline{DE}$

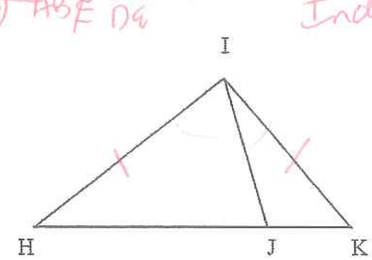


Assume $\overline{AB} \cong \overline{DE}$. We are given that $\overline{AC} \cong \overline{DF}$ and $\overline{BC} \cong \overline{EF}$. So $\triangle ABC \cong \triangle DEF$ by SSS. By CPCTC $\angle C \cong \angle F$. However, this contradicts the given that $\angle C \ncong \angle F$. Therefore, our assumption must be false and $\overline{AB} \ncong \overline{DE}$.

1) Assume $\overline{AB} \cong \overline{DE}$	Assume negation of prove
2) ~~Given~~ $\overline{AC} \cong \overline{DF}$, $\overline{BC} \cong \overline{EF}$	Given
3) $\triangle ABC \cong \triangle DEF$	SSS
4) $\angle C \cong \angle F$	CPCTC
* Contradicts given $\angle C \ncong \angle F$	
5) $\overline{AB} \ncong \overline{DE}$	Indirect reasoning

2. Given: J is not the midpoint of $\overline{HK}$
$\overline{HI} \cong \overline{IK}$

Prove: $\overrightarrow{IJ}$ does not bisect $\angle HIK$

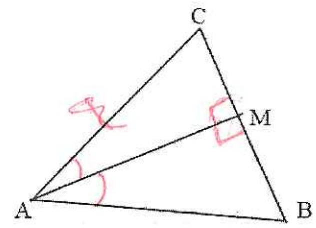


Assume $\overrightarrow{IJ}$ bisects $\angle HIK$. Then $\angle HIJ \cong \angle KIJ$ by defn. bisect. We are given that $\overline{HI} \cong \overline{IK}$. By reflexive $\overline{IJ} \cong \overline{IJ}$ so $\triangle HIJ \cong \triangle KIJ$ by SAS. By CPCTC $\overline{HJ} \cong \overline{KJ}$ which means J is midpt. of $\overline{HK}$ by defn. midpt. This contradicts given that J is not midpt. of $\overline{HK}$. Therefore, our assumption must be false and $\overrightarrow{IJ}$ does not bisect $\angle HIK$

1) Assume $\overrightarrow{IJ}$ bisects $\angle HIK$	
2) $\angle HIJ \cong \angle KIJ$	Defn bisect.
3) $\overline{HI} \cong \overline{IK}$	Given
4) $\overline{IJ} \cong \overline{IJ}$	Refl.
5) $\triangle \cong \triangle$	SAS
6) $\overline{HJ} \cong \overline{KJ}$	CPCTC
7) J is midpt of $\overline{HK}$	defn. midpt.
* Contradicts given that J is NOT midpt.	
8)	

3. Given: ~~$AC = BC$~~
$AB \neq AC$
$\overrightarrow{AM}$ is angle bisector of $\angle BAC$

Prove: $\overline{AM}$ is not perpendicular to $\overline{BC}$.



Assume $\overline{AM} \perp \overline{BC}$. Then $\angle BMA$ and $\angle CMA$ are right $\angle$'s. So $\angle BMA \cong \angle CMA$ by rt. $\angle$'s thm. We are given that $\overline{AM}$ is $\angle$ bisector of $\angle BAC$ which makes $\angle CAM \cong \angle BAM$ by defn. bisector. $\overline{AM} \cong \overline{AM}$ by reflexive. So $\triangle CAM \cong \triangle BAM$ by ASA. Then by CPCTC $\overline{AB} \cong \overline{AC}$ and $AB = AC$ by defn. $\cong$. However this contradicts the given that $AB \neq AC$. Therefore, our assumption must be false and $\overline{AM}$ is not perpendicular to $\overline{BC}$.

Assume $\overline{AM} \perp \overline{BC}$

~~$AC \cong BC$ given~~

~~$AC \cong BC$ Defn $\cong$~~

$\angle CAM \cong \angle BAM$

$\overline{AM} \cong \overline{AM}$ refl.

$\angle BMA$ & $\angle CMA$ rt $\angle$'s

$\angle BMA \cong \angle CMA$

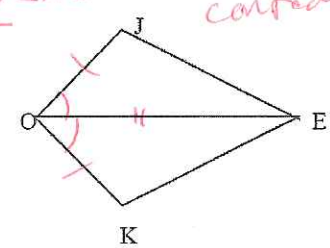
$\triangle \cong \triangle$ ASA

$\overline{AB} \cong \overline{AC}$ CPCTC contradict given

4. Given: $\overline{OJ} \cong \overline{OK}$

$\overline{JE} \not\cong \overline{KE}$

Prove: $\overrightarrow{OE}$ does not bisect $\angle JOK$



Assume $\overline{OE}$ bisects $\angle JOK$

Assume $\overrightarrow{OE}$ bisects $\angle JOK$, Then $\angle JOE \cong \angle KOE$ by defn. bisect. We are given that $\overline{OJ} \cong \overline{OK}$ and we $\overline{OE} \cong \overline{OE}$ by reflexive. So $\triangle JOE \cong \triangle KOE$ by SAS. So by CPCTC $\overline{JE} \cong \overline{KE}$. However, this contradicts the given that $\overline{JE} \not\cong \overline{KE}$. Therefore our assumption must be false and $\overrightarrow{OE}$ does not bisect $\angle JOK$