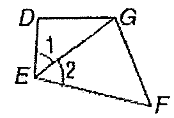
Acc. Geometry
5.3 Practice Indirect Proof

Name Key
Date

1. **Complete the proof.**



Given: $\angle 1 \cong \angle 2$ and $\overline{DG}$ is not congruent to $\overline{FG}$.
Prove: $\overline{DE}$ is not congruent to $\overline{FE}$.

3. Assume that $\overline{DE} \cong \overline{FE}$ — Assume the conclusion is false.

4. $\overline{EG} \cong \overline{EG}$ — Reflexive Prop

5. $\triangle EDG \cong \triangle EFG$ — SAS

6. $\overline{DG} \cong \overline{FG}$ — CPCTC

7. This contradicts the given information, so the assumption must be false

8. Therefore, $\overline{DE}$ is not $\cong$ $\overline{FE}$

Write an indirect proof for each of the following.

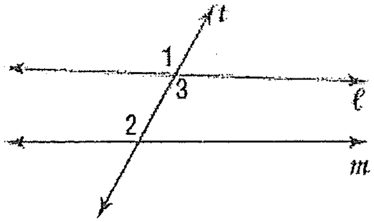
2. **Given:** ΔLMO
Prove: A triangle cannot have two right angles.

Assume a △ can have two right ∡.

Let $m\angle L = 90$ and $m\angle M = 90$ by def of right ∡. Then $\angle A + \angle B + \angle C > 180$ which contradicts the △ Sum theorem

The assumption that a △ can have two right ∡ is false
Therefore, A △ cannot have two right ∡s.

3. **Given:** $m\angle 2 \neq m\angle 1$
Prove: $\ell \nparallel m$



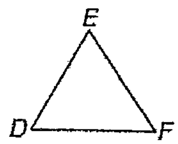
Assume $\ell \parallel m$

If $\ell \parallel m$, then $m\angle 1 = m\angle 2$ because $\parallel$ lines form $\cong$ corresponding ∡s, but this contradicts the given information.

The assumption that $\ell \parallel m$ is false
Therefore, $\ell \nparallel m$.

Write an indirect proof for each of the following.

4. **Given:** $\angle D \not\cong \angle F$.
Prove: $DE \neq EF$

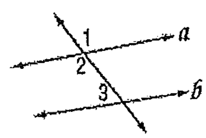


Assume $DE = EF$

If $DE = EF$ then $\measuredangle D = \measuredangle F$ by the isosceles $\triangle$ theorem, but this contradicts the given info.

the assumption that $DE = EF$ is false
Therefore, $DE \neq EF$.

5. **Given:** $m\angle 2 + m\angle 3 \neq 180$
Prove: $a \nparallel b$

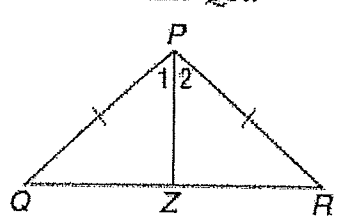


Assume $a \parallel b$

If $a \parallel b$, then $m\angle 2 + m\angle 3 = 180$ because $\parallel$ lines form supplementary consecutive interior $\measuredangle$s, which contradicts the given info.

The assumption $a \parallel b$ is false
Therefore $a \nparallel b$.

6. **Given:** $\overline{PQ} \cong \overline{PR}$
$\angle 1 \not\cong \angle 2$
Prove: $\overline{PZ}$ is not a median of $\triangle PQR$.



Assume $\overline{PZ}$ is a median of $\triangle PQR$

If $\overline{PZ}$ is a median, then Z is a midpoint of QR by definition. If Z is a midpoint then $QZ \cong RZ$. By the Reflexive property $PZ \cong PZ$. $\triangle PQZ \cong \triangle PRZ$ by SSS and $\measuredangle 1 \cong \angle 2$ by CPCTC, which contradicts the given information.

The assumption that $\overline{PZ}$ is a median is false
Therefore $\overline{PZ}$ is not a median.

Alternate
* Instead of $PZ \cong PZ$ by Reflexive Prop you could say $\angle Q = \angle R$ by isos $\triangle$ theorem and $\triangle PQZ \cong \triangle PRZ$ by SAS *