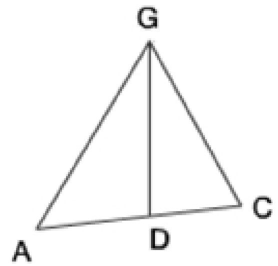
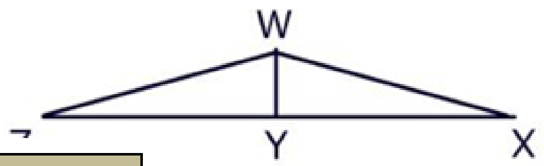
# Triangle Proofs Worksheet

1. **Given:** $\overline{DG}$ bisects $\angle AGC$, $\angle GCD \cong \angle GAD$
**Prove:** $\Delta GCD \cong \Delta GAD$



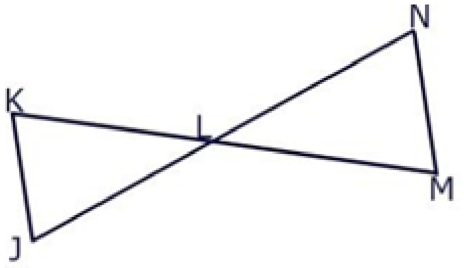

| Statement<br>DG bisects <AGC | Justification<br>Given |
|---|---|
| $\angle CGD = \angle AGD$ | Definition of bisect |
| $\angle GCD = \angle GAD$ | Given |
| GD = GD | Common side |
| $\Delta CGD \cong \Delta AGD$ | AAS |

2. **Given**: $\overline{WZ} \cong \overline{WX}$, $\overline{WY}$ bisects $\overline{ZX}$
**Prove:** $\Delta WYZ \cong \Delta WYX$



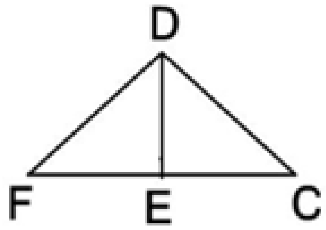

| Statement<br>WY bisects ZX | Justification<br>Given |
|---|---|
| WZ = WX | Given |
| ZY = XY | Definition of bisect |
| WY = WY | Common side |
| Δ WZY ≅ Δ WXY | SSS |

3. **Given**: KM bisects JN , $\angle K \cong \angle M$
**Prove** $\Delta KLJ \cong \Delta MLN$




| Statement<br>KM bisects JN | Justification<br>Given |
|---|---|
| JL = NL | Definition of bisect |
| $\angle K = \angle M$ | Given |
| $\angle KLJ = \angle MLN$ | Opposite angles |
| $\Delta KLJ \cong \Delta MLN$ | AAS |

4. **Given:** DE is a perpendicular bisector of FC.
$DF \cong DC$
**Prove:** $\Delta DEF \cong \Delta DEC$



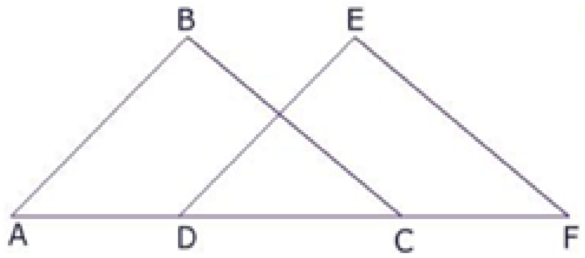

| Statement | Justification |
|---|---|
| DE is a perpendicular bisector of FC | Given |
| FE = CE | Definition of bisect |
| $\angle DEF = \angle DEC = 90°$ | Definition of perpendicular |
| DF = DC | Given |
| DF and DC are hypotenuses of their respective triangles | Definition of hypotenuse |
| $\Delta DEF \cong \Delta DEC$ | HL |

* Note: We could prove these triangles are congruent using SAS.

5. Given $\overline{BC} \parallel \overline{EF}$

$\overline{AD} \cong \overline{CF}$

$\angle ABC \cong \angle DEF$

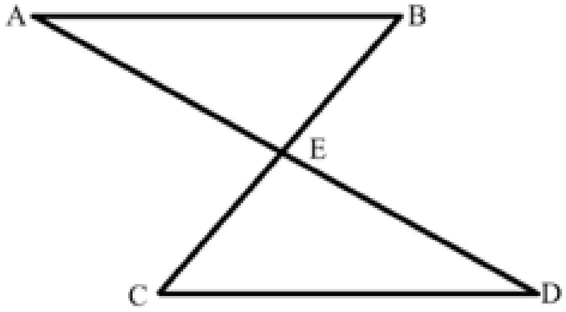



**Prove** $\triangle ABC \cong \triangle DEF$

| Statement | Justification |
|---|---|
| BC \|\| EF | Given |
| $\angle BCA = \angle EFD$ | Corresponding angles |
| AC = AD + DC<br><br>DF = CF + DC | Segment addition |
| AD = CF | Given |
| AC = DF | Transitive property |
| $\angle ABC = \angle DEF$ | Given |
| $\Delta ABC \cong \Delta DEF$ | AAS |

6. **Given:** AB = DC, and AB || DC

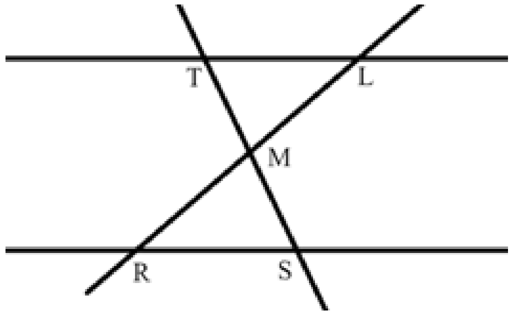
**Prove:** AE ≅ DE




| Statement | Justification |
|---|---|
| AB = DC | Given |
| AB \|\| DC | Given |
| ∠A = ∠D | Alternate interior angles |
| ∠B = ∠C | Alternate interior angles |
| Δ ABE ≅ Δ DCE | ASA |
| AE ≅ DE | CPCTC |

7. **Given:** TL || RS, and M is the midpoint of LR

**Prove:** M is the midpoint of TS




| Statement | Justification |
|---|---|
| M is the midpoint of LR | Given |
| LM = RM | Definition of midpoint |
| TL \|\| RS | Given |
| ∠TLM = ∠SRM | Alternate interior angles |
| ∠LTM = ∠RSM | Alternate interior angles |
| Δ TLM ≅ Δ SRM | AAS |
| TM ≅ SM | CPCTC |
| M is the midpoint of TS | Definition of midpoint |