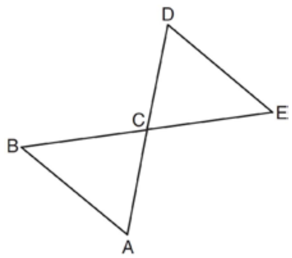
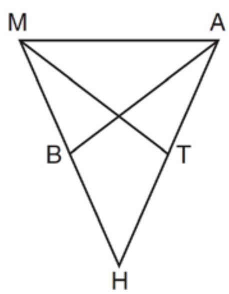
G.SRT.B.5: Triangle Proofs 2

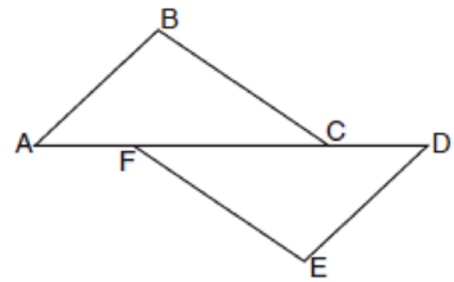
1 Given: $\overline{BE}$ and $\overline{AD}$ intersect at point C
$\overline{BC} \cong \overline{EC}$
$\overline{AC} \cong \overline{DC}$
$\overline{AB}$ and $\overline{DE}$ are drawn
Prove: $\triangle ABC \cong \triangle DEC$



2 In the diagram of $\triangle MAH$ below, $\overline{MH} \cong \overline{AH}$ and medians $\overline{AB}$ and $\overline{MT}$ are drawn.
Prove: $\angle MBA \cong \angle ATM$



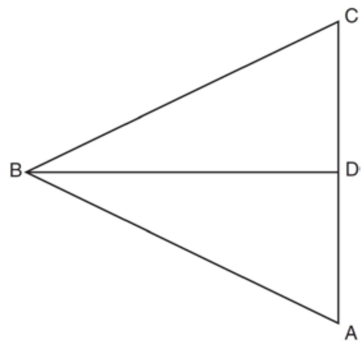
3 Complete the partial proof below for the accompanying diagram by providing reasons for steps 3, 6, 8, and 9.



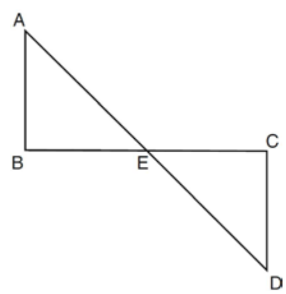
Given: $\overline{AFCD}$, $\overline{AB} \perp \overline{BC}$, $\overline{DE} \perp \overline{EF}$, $\overline{BC} \parallel \overline{FE}$, $\overline{AB} \cong \overline{DE}$
Prove: $\overline{AC} \cong \overline{FD}$

Statements	Reasons
1 $\overline{AFCD}$	1 Given
2 $\overline{AB} \perp \overline{BC}$, $\overline{DE} \perp \overline{EF}$	2 Given
3 $\angle B$ and $\angle E$ are right angles.	3
4 $\angle B \cong \angle E$	4 All right angles are congruent.
5 $\overline{BC} \parallel \overline{FE}$	5 Given
6 $\angle BCA \cong \angle EFD$	6
7 $\overline{AB} \cong \overline{DE}$	7 Given
8 $\triangle ABC \cong \triangle DEF$	8
9 $\overline{AC} \cong \overline{FD}$	9

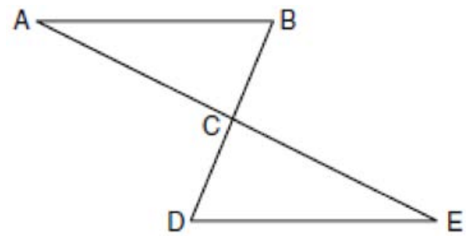
4 Given: $\triangle ABC$, $\overline{BD}$ bisects $\angle ABC$, $\overline{BD} \perp \overline{AC}$
Prove: $\overline{AB} \cong \overline{CB}$



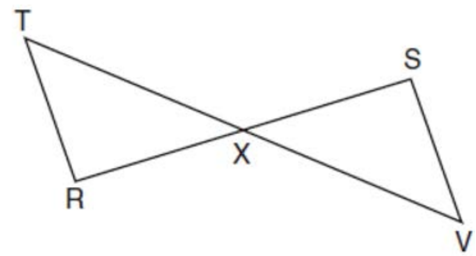
5 Given: $\overline{AD}$ bisects $\overline{BC}$ at E.
$\overline{AB} \perp \overline{BC}$
$\overline{DC} \perp \overline{BC}$
Prove: $\overline{AB} \cong \overline{DC}$



6 Given: $\triangle ABC$ and $\triangle EDC$, C is the midpoint of $\overline{BD}$ and $\overline{AE}$
Prove: $\overline{AB} \parallel \overline{DE}$

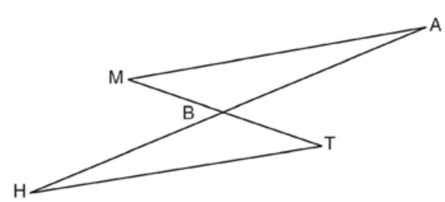


7 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



Prove: $\overline{TR} \parallel \overline{SV}$

8 Given: $\overline{MT}$ and $\overline{HA}$ intersect at B, $\overline{MA} \parallel \overline{HT}$, and $\overline{MT}$ bisects $\overline{HA}$.



Prove: $\overline{MA} \cong \overline{HT}$

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Answer Section

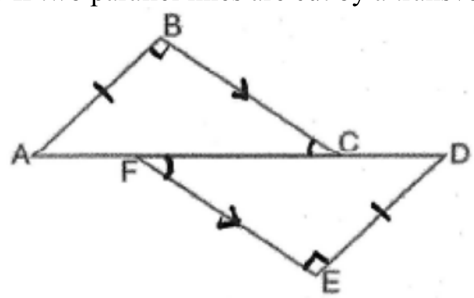
1 ANS:
$\overline{BE}$ and $\overline{AD}$ intersect at point C, $\overline{BC} \cong \overline{EC}$, $\overline{AC} \cong \overline{DC}$, $\overline{AB}$ and $\overline{DE}$ are drawn (Given). $\angle BCA \cong \angle ECD$ (Vertical Angles). $\triangle ABC \cong \triangle DEC$ (SAS).

REF: 011529ge

2 ANS:
$\triangle MAH$, $\overline{MH} \cong \overline{AH}$ and medians $\overline{AB}$ and $\overline{MT}$ are given. $\overline{MA} \cong \overline{AM}$ (reflexive property). $\triangle MAH$ is an isosceles triangle (definition of isosceles triangle). $\angle AMB \cong \angle MAT$ (isosceles triangle theorem). B is the midpoint of $\overline{MH}$ and T is the midpoint of $\overline{AH}$ (definition of median). $\text{m}\overline{MB} = \frac{1}{2}\text{m}\overline{MH}$ and $\text{m}\overline{AT} = \frac{1}{2}\text{m}\overline{AH}$ (definition of midpoint). $\overline{MB} \cong \overline{AT}$ (multiplication postulate). $\triangle MBA \cong \triangle ATM$ (SAS). $\angle MBA \cong \angle ATM$ (CPCTC).

REF: 061338ge

3 ANS:
3 Perpendicular line segments form right angles; 6 If two parallel lines are cut by a transversal, the alternate



interior angles are congruent; 8 AAS; 9 CPCTC.

REF: 060229b

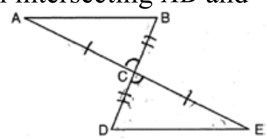
4 ANS:
$\triangle ABC$, $\overline{BD}$ bisects $\angle ABC$, $\overline{BD} \perp \overline{AC}$ (Given). $\angle CBD \cong \angle ABD$ (Definition of angle bisector). $\overline{BD} \cong \overline{BD}$ (Reflexive property). $\angle CDB$ and $\angle ADB$ are right angles (Definition of perpendicular). $\angle CDB \cong \angle ADB$ (All right angles are congruent). $\triangle CDB \cong \triangle ADB$ (SAS). $\overline{AB} \cong \overline{CB}$ (CPCTC).

REF: 081335ge

5 ANS:
$\angle B$ and $\angle C$ are right angles because perpendicular lines form right angles. $\angle B \cong \angle C$ because all right angles are congruent. $\angle AEB \cong \angle DEC$ because vertical angles are congruent. $\triangle ABE \cong \triangle DCE$ because of ASA. $\overline{AB} \cong \overline{DC}$ because CPCTC.

REF: 061235ge

6 ANS:
$\overline{AC} \cong \overline{EC}$ and $\overline{DC} \cong \overline{BC}$ because of the definition of midpoint. $\angle ACB \cong \angle ECD$ because of vertical angles. $\triangle ABC \cong \triangle EDC$ because of SAS. $\angle CDE \cong \angle CBA$ because of CPCTC. $\overline{BD}$ is a transversal intersecting $\overline{AB}$ and $\overline{ED}$. Therefore $\overline{AB} \parallel \overline{DE}$ because $\angle CDE$ and $\angle CBA$ are congruent alternate interior angles.



REF: 060938ge

7 ANS:
$\overline{RS}$ and $\overline{TV}$ bisect each other at point X; $\overline{TR}$ and $\overline{SV}$ are drawn (given); $\overline{TX} \cong \overline{XV}$ and $\overline{RX} \cong \overline{XS}$ (segment bisectors create two congruent segments); $\angle TXR \cong \angle VXS$ (vertical angles are congruent); $\triangle TXR \cong \triangle VXS$ (SAS); $\angle T \cong \angle V$ (CPCTC); $\overline{TR} \parallel \overline{SV}$ (a transversal that creates congruent alternate interior angles cuts parallel lines).

REF: 061733geo

8 ANS:
$\overline{MT}$ and $\overline{HA}$ intersect at B, $\overline{MA} \parallel \overline{HT}$, and $\overline{MT}$ bisects $\overline{HA}$ (Given). $\angle MBA \cong \angle TBH$ (Vertical Angles). $\angle A \cong \angle H$ (Alternate Interior Angles). $\overline{BH} \cong \overline{BA}$ (The bisection of a line segment creates two congruent segments). $\triangle MAB \cong \triangle THB$ (ASA). $\overline{MA} \cong \overline{HT}$ (CPCTC).

REF: 081435ge