

Name Key  
Geometry \_\_\_\_\_

Date \_\_\_\_\_

Double Congruent Triangles Proofs

Question A:

What does the title of this packet tell you about the problems you are about to see?

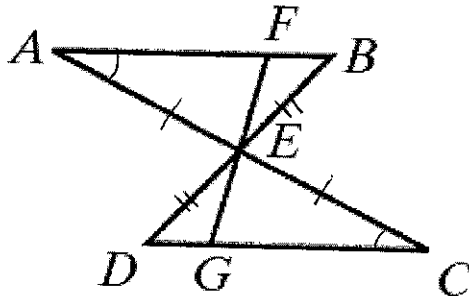
Proving 2 Pairs of  $\cong \Delta$ s

Question B:

Construct a Two-Column Proof:

Given:  $\overline{AC}$  and  $\overline{BD}$  bisect each other.

Prove:  $\triangle AEF \cong \triangle CEG$



- 1) Before you begin the proof, consider the Prove statement. What theorems could be used to justify this statement? (Hint: There are five, list all)

SSS, SAS, ASA, AAS, HL

- 2) Mark your model from the Given statement. Based upon these markings what pair of triangles contain your marks?

$\triangle AEB \cong \triangle CED$

- 3) Is the pair of triangles you listed in (2) the same as the pair of triangles listed in your Prove statement?

No

- 4) If you answered yes, either talk to a partner or your teacher. If you answered no, what type of proof is this?

Double  $\cong \Delta$

- 5) Can you easily prove the pair of triangles you listed in (2) congruent? If yes, state the method. If no, consider this hint. (Hint: Look for a pair of vertical angles).

Yes, SAS

- 6) List all of the pairs of congruent corresponding **parts** (sides and angles) for the triangles from (2).

<u>SAS</u>	<u>CPCTC</u>
$AE \cong CE$	$AB \cong CD$
$DE \cong BE$	$\angle A \cong \angle C$
$\angle AEB \cong \angle CED$	$\angle B \cong \angle D$

- 7) List all the pairs of corresponding **parts** (sides and angles) for the triangles in the Prove statement.

$AE \cong CE$	$\angle A \cong \angle C$
$EF \cong EG$	$\angle AEF \cong \angle CEG$
$AF \cong CG$	$\angle EFA \cong \angle EGC$

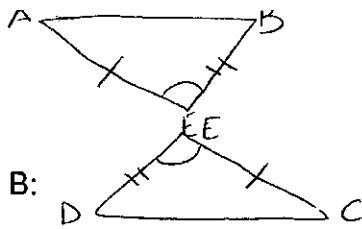
- 8) Are there any corresponding parts that you wrote for (6) **AND** (7)? If yes, state them.

Yes  $AE \cong CE$  and  $\angle A \cong \angle C$

- 9) Examine your markings from your given statement and the corresponding parts you listed in (8). Is it now possible to prove the Prove statement? If yes, list the method.

Yes, ASA

- 10) Using all of your answers above you have formulated a plan for this proof. Complete the proof on the following page.



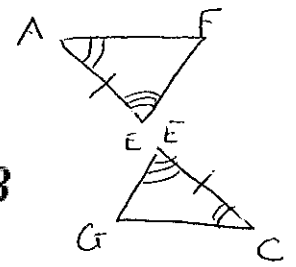
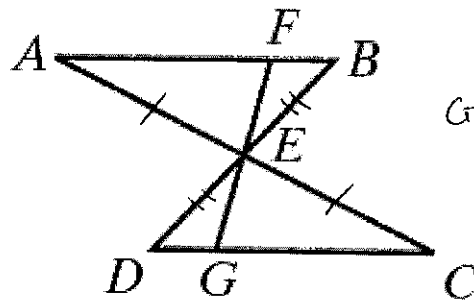
Question B:

Use questions 1-10 to write up this proof.

Construct a Two-Column Proof:

Given:  $\overline{AC}$  and  $\overline{BD}$  bisect each other.

Prove:  $\triangle AEF \cong \triangle CEG$



S	R
① $\overline{AC}$ & $\overline{BD}$ bisect each other	① Given
② $AE \cong CE$ $BE \cong DE$	② A segment bisector divides a segment into 2 $\cong$ segments
③ $\angle AEB \cong \angle CED$	③ Intersecting lines form $\cong$ vertical $\angle$ s
④ $\triangle AEB \cong \triangle CED$	④ SAS $\cong$ SAS
⑤ $\angle A \cong \angle C$	⑤ CPCTC
⑥ $\angle AEF \cong \angle CEG$	⑥ Intersecting lines form $\cong$ vertical $\angle$ s
⑦ $\triangle AEF \cong \triangle CEG$	⑦ ASA $\cong$ ASA

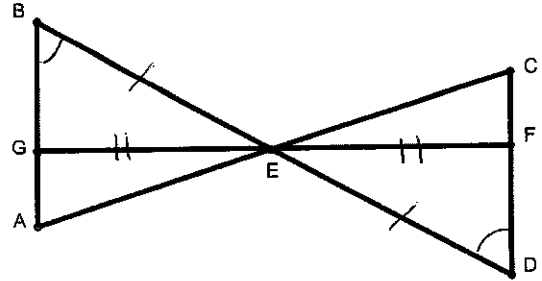
Question C:

Construct a Two-Column Proof

Given:  $\overline{AEC}$ ,  $\overline{BED}$ ,  $\overline{GEF}$ .

$\overline{BD}$  and  $\overline{GF}$  bisect each other.

Prove:  $\triangle DEC \cong \triangle BEA$



- 1) Before you begin the proof, consider the Prove statement. What theorems could be used to justify this statement? (Hint: There are five, list all)

SSS, SAS, ASA, AAS, HL

- 2) Mark your model from the Given statement. Based upon these markings what pair of triangles contain your marks?

$\triangle BEG$  &  $\triangle DEF$

- 3) Is the pair of triangles you listed in (2) the same as the pair of triangles listed in your Prove statement?

No

- 4) If you answered yes, either talk to a partner or your teacher. If you answered no, what type of proof is this?

Double  $\cong \triangle$

- 5) Can you easily prove the pair of triangles you listed in (2) congruent? If yes, state the method. If no, consider this hint. (Hint: Look for a pair of vertical angles).

Yes, SAS

- 6) List all of the pairs of congruent corresponding **parts** (sides and angles) for the triangles from (2).

$$\begin{array}{ll} \underline{SAS} & \underline{CPCTC} \\ BE \cong DE & BG \cong DF \\ GE \cong FE & \angle B \cong \angle D \\ \angle BEG \cong \angle DEF & \angle BGE \cong \angle DFE \end{array}$$

- 7) List all the pairs of corresponding **parts** (sides and angles) for the triangles in the Prove statement.

$$\begin{array}{ll} DE \cong BE & \angle D \cong \angle B \\ EC \cong EA & \angle DEC \cong \angle BEA \\ CD \cong AB & \angle C \cong \angle A \end{array}$$

- 8) Are there any corresponding parts that you wrote for (6) **AND** (7)? If yes, state them.

Yes,  $BE \cong DE$  and  $\angle B \cong \angle D$

- 9) Examine your markings from your given statement and the corresponding parts you listed in (8). Is it now possible to prove the Prove statement? If yes, list the method.

Yes, ASA

- 10) Using all of your answers above you have formulated a plan for this proof. Complete the proof on the following page.

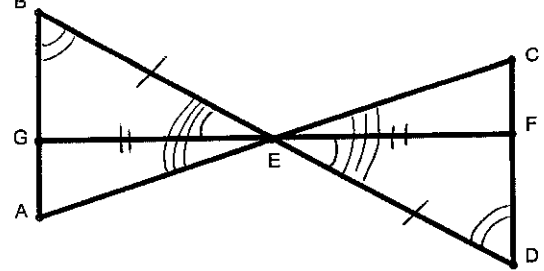
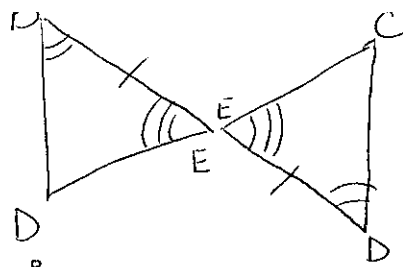
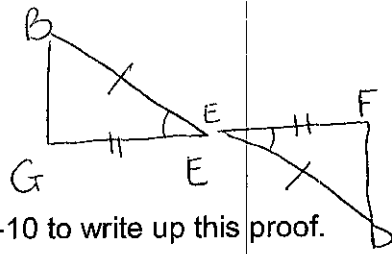
Question C:

Use questions 1-10 to write up this proof.

Given:  $\overline{AEC}$ ,  $\overline{BED}$ ,  $\overline{GEF}$ .

$\overline{BD}$  and  $\overline{GF}$  bisect each other.

Prove:  $\triangle DEC \cong \triangle BEA$



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①  $\overline{AEC}$ ,  $\overline{BED}$ ,  $\overline{GEF}$   
 $\overline{BD}$  &  $\overline{GF}$  bisect each other

②  $BE \cong DE$

$GE \cong FE$

③  $\angle BEG \cong \angle DEF$

④  $\triangle BEG \cong \triangle DEF$

⑤  $\angle D \cong \angle B$

⑥  $\angle BEA \cong \angle DEC$

⑦  $\triangle DEC \cong \triangle BEA$

① Given

② A segment bisector divides a segment into 2  $\cong$  segments

③ Intersecting lines form  $\cong$  vertical  $\angle$ s

④ SAS  $\cong$  SAS

⑤ CPCTC

⑥ Intersecting lines form  $\cong$  vertical  $\angle$ s

⑦ ASA  $\cong$  ASA