Name____ Date____________________________

Geometry Ms. Williams

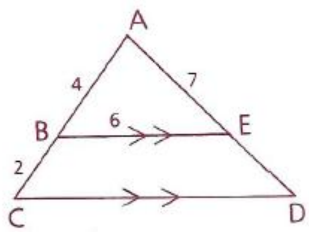
Methods of Proving Triangles Similar – Day 1

SWBAT: Use several methods to prove that triangles are similar.

Warm – Up

Given: $\overleftrightarrow{BE} \parallel \overleftrightarrow{CD}$,
lengths as shown

Find: **a** ED
b CD

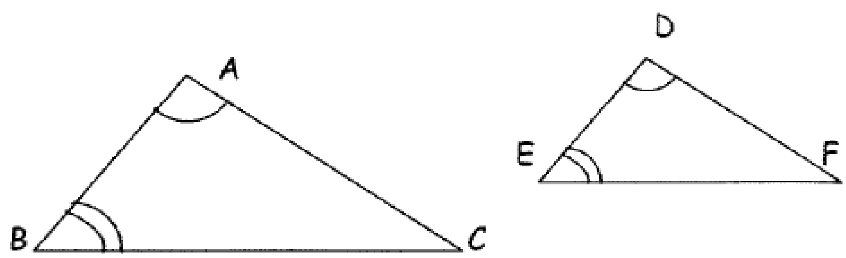


☑AAA- Triangles must be similar.

$\boxed{\text{Thm: AA}}$

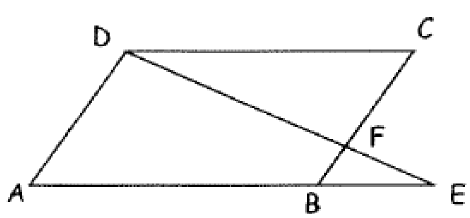
Given: $\angle A \cong \angle D$,
$\angle B \cong \angle E$

Concl: _______________



G: ABCD is a parallelogram

P: $\Delta BFE \sim \Delta CFD$

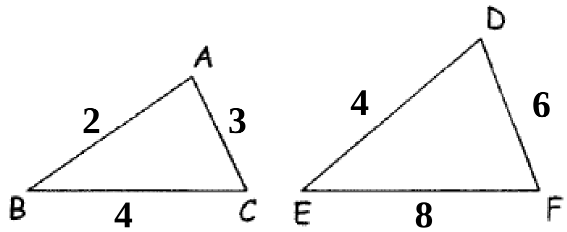


1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Thm: (SSS ~) if there exists a correspondence between the vertices of 2 Δ's such that the ratios of the measures of the corresponding sides are equal, then the Δ's are ~ .

Given: $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

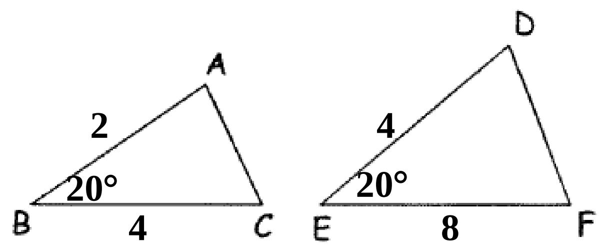
Concl:________________________



Thm: (SAS ~) If there exists a correspondence between the vertices of 2 Δ's such that the ratios of the measures of two pairs of corresponding sides are equal and the included angles are congruent, then the Δ's are ~ .

Given: $\frac{AB}{DE} = \frac{BC}{EF}$

$\angle B \cong \angle E$

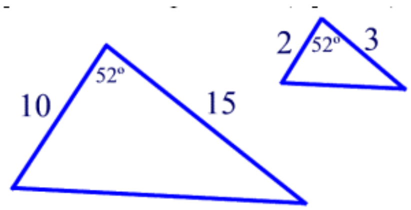


Concl:________________________

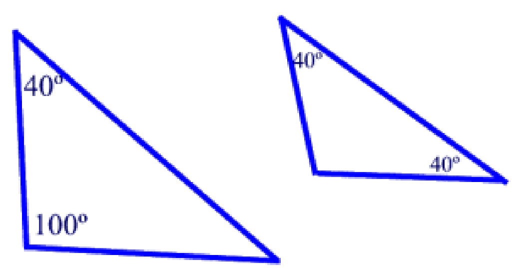
Practice

Explain how you know the triangles are similar, and write a similarity statement.

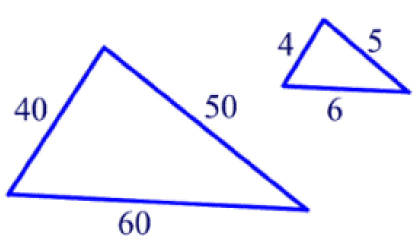
1.



2.

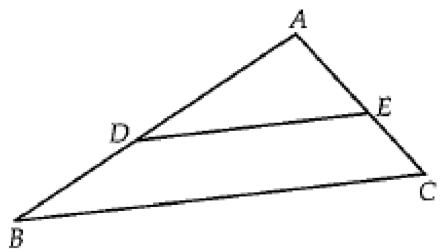


3.



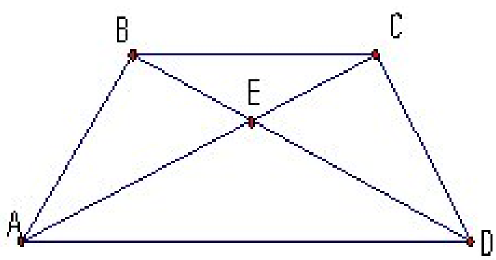
Proofs Practice with AA~

Given: $\triangle ABC$, D is a point on $\overline{AB}$ and E is a point on $\overline{AC}$ such that $\overline{DE} \parallel \overline{BC}$.



1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Given Trapezoid ABCD, Prove $\Delta BEC \sim \Delta DEA$

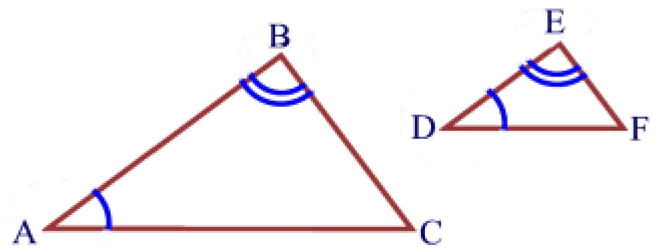


1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Summary

AA	To show two triangles are similar, it is sufficient to show that two angles of one triangle are congruent (equal) to two angles of the other triangle.

Theorem: If two angles of one triangle are congruent to two angles of another triangle, the triangles are similar.



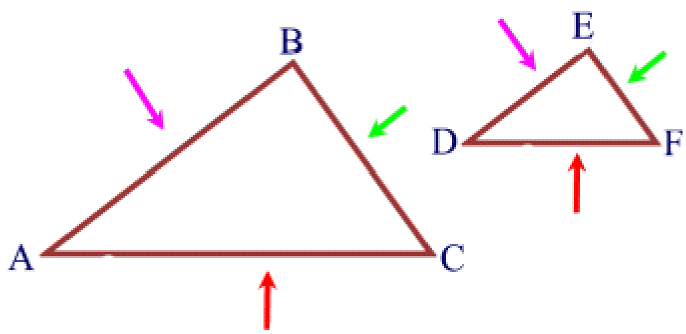
If: $\measuredangle A \cong \measuredangle D$

$\measuredangle B \cong \measuredangle E$

Then: $\Delta ABC \sim \Delta DEF$

SSS for similarity	BE CAREFUL!! SSS for similar triangles is NOT the same theorem as we used for congruent triangles. To show triangles are similar, it is sufficient to show that the three sets of corresponding sides are in proportion.

Theorem: If the three sets of corresponding sides of two triangles are in proportion, the triangles are similar.

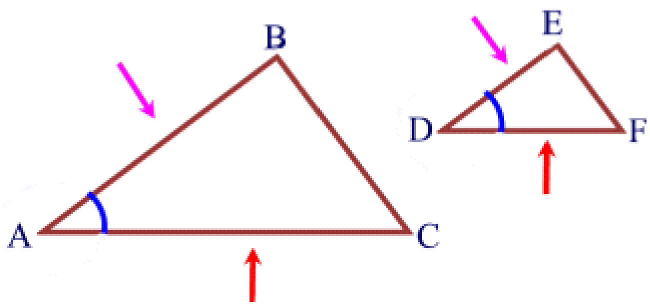


If: $\dfrac{AB}{DE} = \dfrac{AC}{DF} = \dfrac{BC}{EF}$

Then: $\Delta ABC \sim \Delta DEF$

SAS for similarity	BE CAREFUL!! SAS for similar triangles is NOT the same theorem as we used for congruent triangles. To show triangles are similar, it is sufficient to show that two sets of corresponding sides are in proportion and the angles they include are congruent.

Theorem: If an angle of one triangle is congruent to the corresponding angle of another triangle and the lengths of the sides including these angles are in proportion, the triangles are similar.



If: $\measuredangle A \cong \measuredangle D$

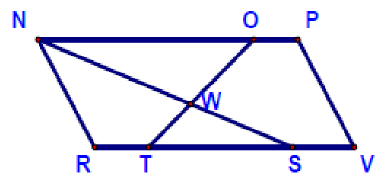
$\dfrac{AB}{DE} = \dfrac{AC}{DF}$

Then: $\Delta ABC \sim \Delta DEF$

Homework

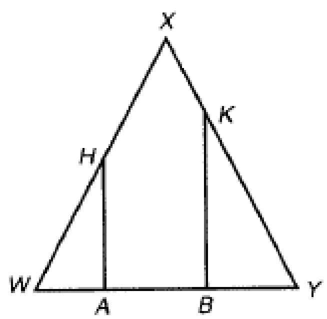
1. Given: NPVR is a parallelogram

Prove: $\triangle NWO \sim \triangle SWT$



Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

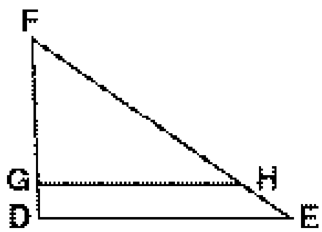
2. Given: $\overline{XW} \cong \overline{XY}$,
$\overline{HA} \perp \overline{WY}$, $\overline{KB} \perp \overline{WY}$
Prove: $\triangle HWA \sim \triangle KYB$.



Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

3. Given: $\overline{GH} \parallel \overline{DE}$

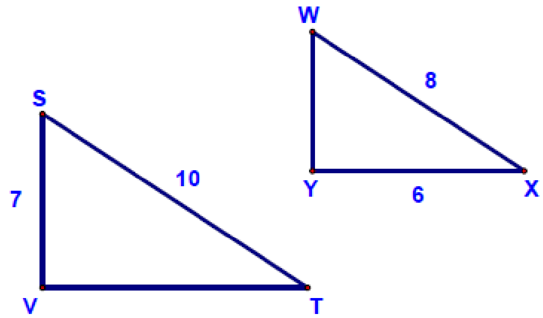
Prove: $\Delta FGH \sim \Delta FDE$



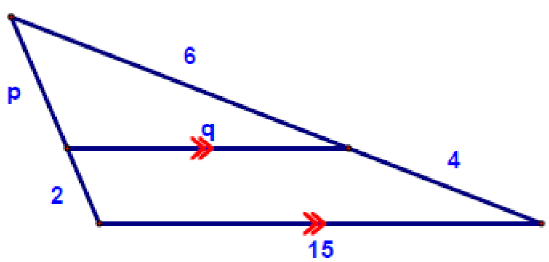
Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

4. **Given:** $\triangle SVT \sim \triangle WYX$ with measures as shown

Find: WY and VT

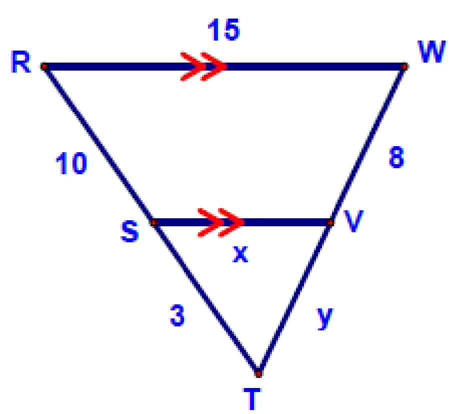


5. **Solve for p and q in the figure shown.**



6. $\overleftrightarrow{SV} \parallel \overleftrightarrow{RW}$

Find SV & VT



Name____ Date____________________________

Geometry Ms. Williams

Methods of Proving Triangles Similar – Day 2

SWBAT: Students will be able to prove

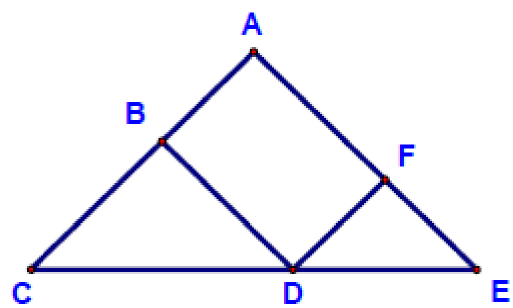
- **Proportions involving Line Segments**
- **Products involving Line Segments**

Warm – Up

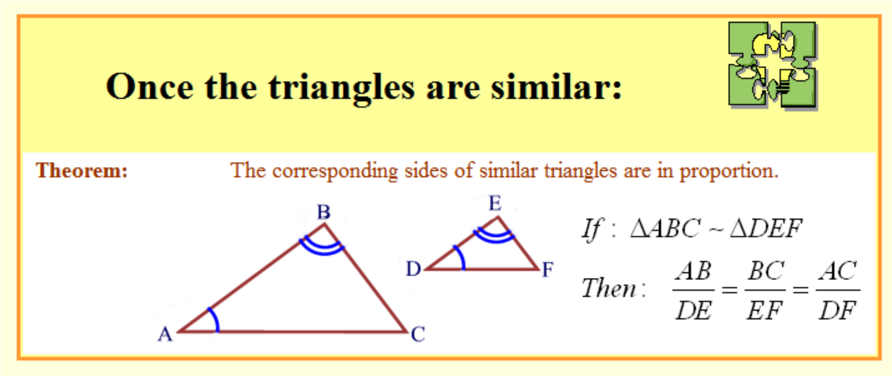
Given: $\overline{AC} \cong \overline{AE}$

$\angle CBD \cong \angle EFD$

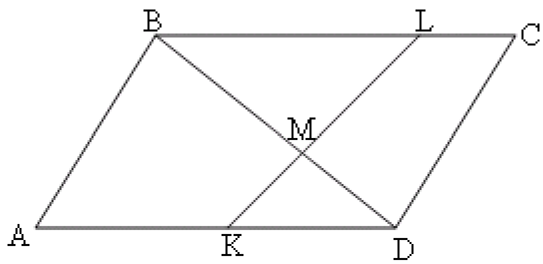
Prove: $\triangle BCD \sim \triangle FED$



Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8



Given: ABCD is a parallelogram
Prove: KM x LB = LM x KD



To develop a plan reason backwards from the "prove" by answering three questions

1. ***What proportion produces the product KM x LB = LM x KD***?

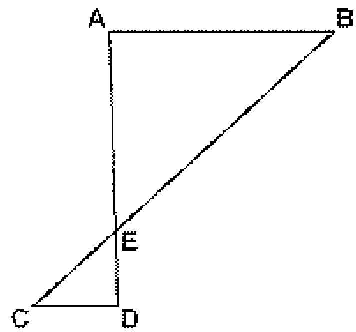
2. ***Which pair of triangles must be proven to be similar?***

3. ***How can I prove ΔKMD is similar to ΔLMB***?

Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

B. Given: $\overline{AB} \parallel \overline{CD}$

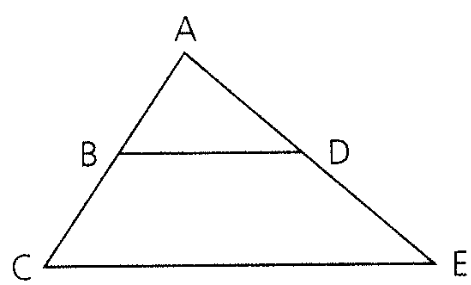
Prove: $\dfrac{AE}{ED} = \dfrac{BE}{CE}$



Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

C. *Given:* $\overleftrightarrow{BD} \parallel \overleftrightarrow{CE}$

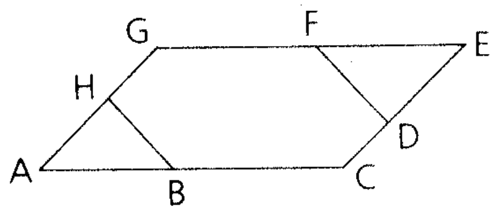
Prove: $AB \cdot CE = AC \cdot BD$



Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

D. Given: $\square ACEG$, $\angle ABH \cong \angle EFD$

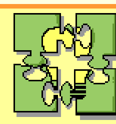
Prove: $AB \cdot FD = HB \cdot EF$



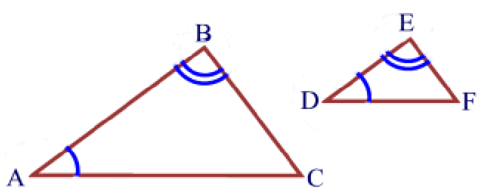
Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

SUMMARY

Once the triangles are similar:



Theorem: The corresponding sides of similar triangles are in proportion.



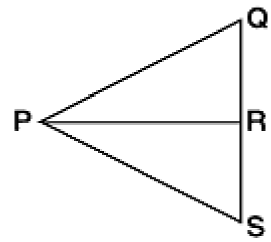
If: $\Delta ABC \sim \Delta DEF$

Then: $\dfrac{AB}{DE} = \dfrac{BC}{EF} = \dfrac{AC}{DF}$

HW

1. Given: $\overline{PQ} \cong \overline{PS}$
$\overline{PR}$ bisects $\angle QPS$

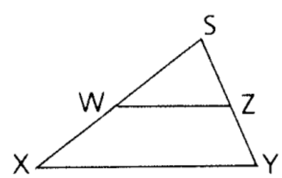
Prove: $\Delta PQR \sim \Delta PRS$



Statements	Reasons
1	1
2	2
3	3
4	4
5	5

2. Given: $\overleftrightarrow{WZ} \parallel \overleftrightarrow{XY}$

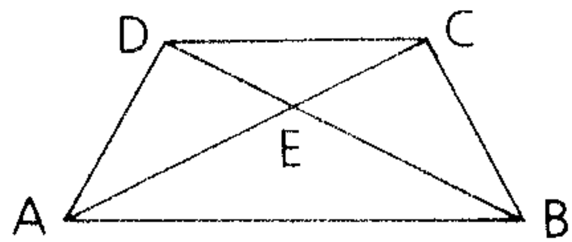
Prove: $\frac{WS}{XS} = \frac{WZ}{XY}$



Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

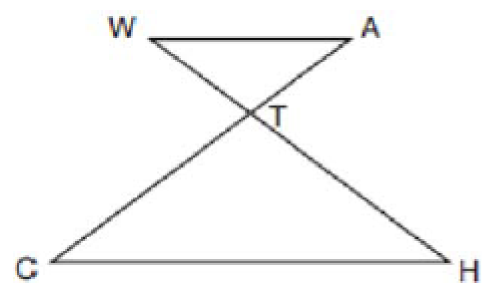
3. Given: Trapezoid ABCD, with bases $\overline{AB}$ and $\overline{CD}$

Prove: $AE \cdot CD = EC \cdot AB$



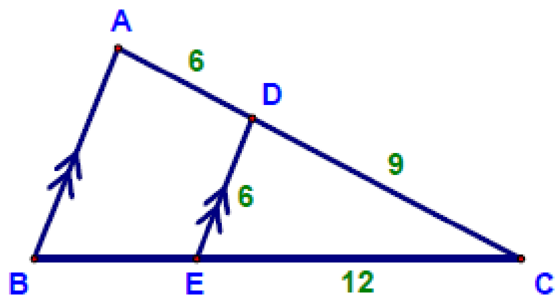
Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

4. In the accompanying diagram, $\overline{WA} \parallel \overline{CH}$ and $\overline{WH}$ and $\overline{AC}$ intersect at point T. Prove that $(WT)(CT) = (HT)(AT)$.



Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

5. Find AB & BE.

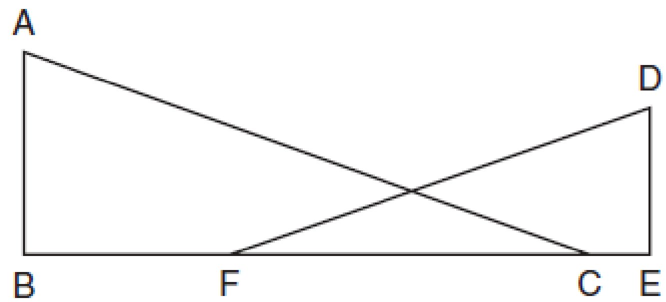


6. Two triangles are similar. The sides of the first triangle are 7, 9, and 11. The smallest side of the second triangle is 21. Find the perimeter of the second triangle.

Name____ **Date**_____________________________
Geometry **Ms. Williams**

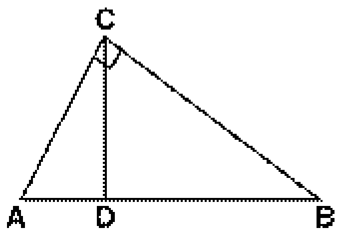
Review of Proving Triangles Similar – Day 3

1. In the diagram below, $\overline{BFCE}$, $\overline{AB} \perp \overline{BE}$, $\overline{DE} \perp \overline{BE}$, and $\angle BFD \cong \angle ECA$. Prove that $\triangle ABC \sim \triangle DEF$.



Statements	Reasons
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

2.



Given: In ΔABC, $\angle ACB$ is a right angle and $\overline{CD} \perp \overline{AB}$

Prove: (a) $\Delta ABC \sim \Delta CBD$

(b) $\frac{AB}{BC} = \frac{BC}{BD}$

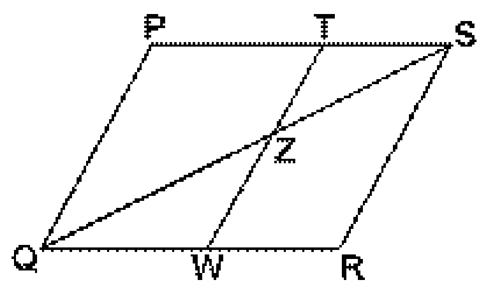
(c) $BC^2 = AB \times BD$

(1) In ΔABC, $\angle ACB$ is a right angle, $\overline{CD} \perp \overline{AB}$	(1)
(2) $\angle CDB$ is a right angle	(2)
(3) $\angle ACB \cong \angle CDB$	(3)
(4) $\angle B \cong \angle B$	(4)
(5) $\Delta ABC \sim \Delta CBD$	(5)
(6) $\frac{AB}{BC} = \frac{BC}{BD}$	(6)
(7) $BC^2 = AB \times BD$	(7)

3. Given: ▱PQRS with diagonal $\overline{QS}$

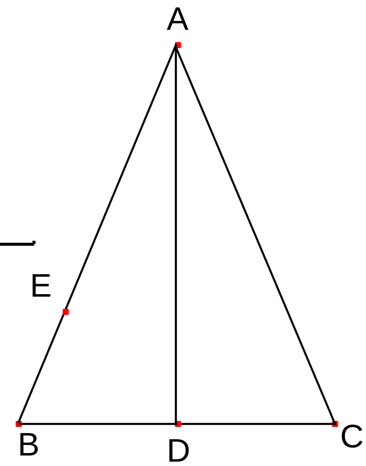
$\overline{QS}$ and $\overline{TW}$ intersect at Z.

Prove: $\overline{TS} \times \overline{ZW} = \overline{SZ} \times \overline{QW}$



Statements	**Reasons**

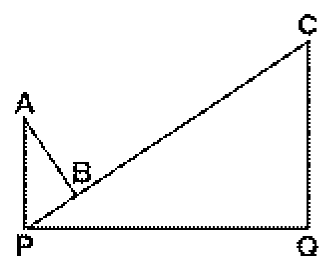
4. ΔABC is isosceles with $\overline{AB} \cong \overline{AC}$, altitudes $\overline{CE}$ and $\overline{AD}$ are drawn.
Prove that $(AC)(EB) = (CB)(DC)$



Statements	Reasons

5. Given: $\overline{AP} \perp \overline{PQ}$
$\overline{CQ} \perp \overline{PQ}$
$\overline{AB} \perp \overline{PC}$

Prove: $AP \cdot QC = PB \cdot PC$



Statements	Reasons