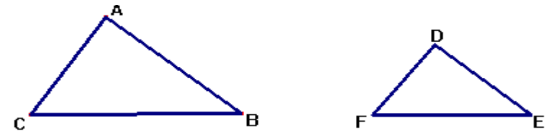
8.4 Congruences and Proportions In Similar Triangles



Given: $\triangle ABC \sim \triangle DEF$

There are three things that we can prove AFTER we have two similar triangles:

1. Corresponding SIDES of similar triangles are proportional (CSSTP)

1. $\triangle ABC \sim \triangle DEF$ 2. $\frac{AB}{DE} = \frac{CB}{FE}$	1. Given 2. CSSTP

2. Corresponding ANGLES of similar triangles are congruent (CASTC)

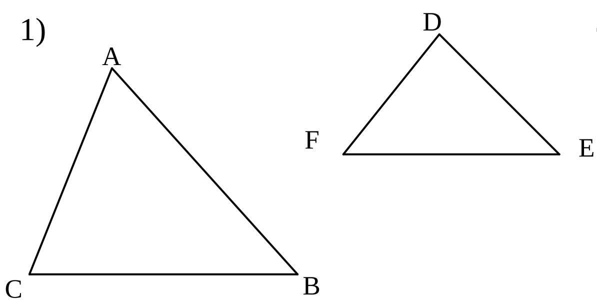
1. $\triangle ABC \sim \triangle DEF$ 2. $\angle A \cong \angle D$	1. Given 2. CASTC

3. Products of sides are equal – Reason: means extremes Th$^{\underline{m}}$

1. $\triangle ABC \sim \triangle DEF$ 2. $\frac{AB}{DE} = \frac{CB}{FE}$ 3. $AB \cdot FE = DE \cdot CB$	1. Given 2. CSSTP 3. Means Extremes Th$^{\underline{m}}$

Examples: State the reason for the prove statement

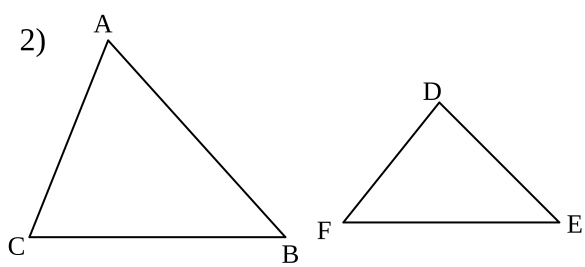
1)



Given: $\Delta ABC \sim \Delta DEF$ Prove: $\frac{AB}{DE} = \frac{AC}{DF}$

Reason: Corresponding sides of similar Δ's are proportional

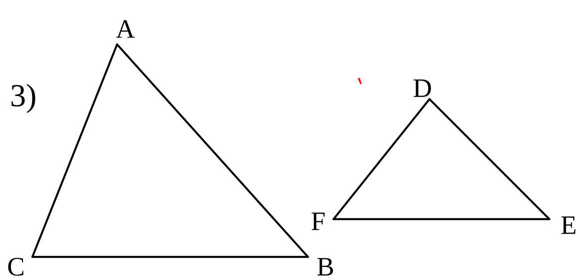
2)



Given: $\Delta ABC \sim \Delta DEF$ Prove: $AB \bullet DF = DE \bullet AC$

Reason: Means Extremes Th$^{\underline{m}}$

3)

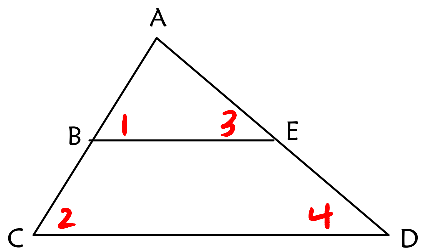


Given: $\Delta ABC \sim \Delta DEF$ Prove: $\angle ABC \cong \angle DEF$

Reason: Corresponding angles of similar Δ's are congruent

4. Given: $\overleftrightarrow{BE} \,||\, \overleftrightarrow{CD}$

Prove: $\frac{AB}{AC} = \frac{BE}{CD}$



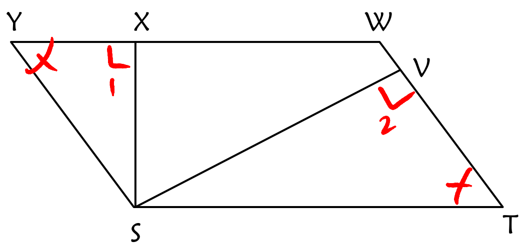
1. $\overline{BE} \parallel \overline{CD}$	1. Given
2. $\angle 1 \cong \angle 2$	2. If ∥ lines → corr ∠s ≅
3. $\angle 3 \cong \angle 4$	3. " "
4. $\triangle ABE \sim \triangle ACD$	4. AA~
5. $\frac{AB}{AC} = \frac{BE}{CD}$	5. CSSTP

5. Given: ▱ YSTW

$\overline{SX} \perp \overline{YW}$

$\overline{SV} \perp \overline{WT}$

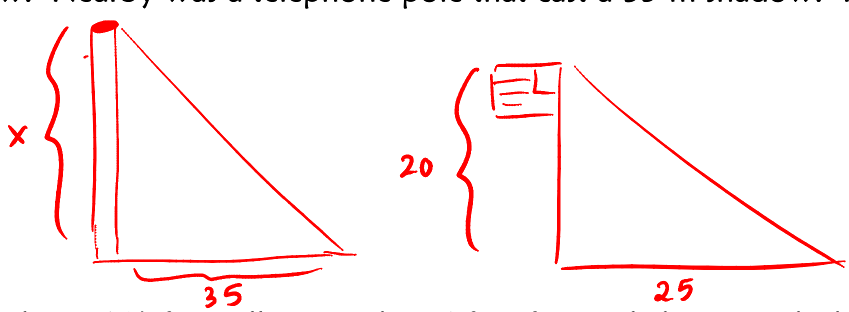
Prove: $SX \cdot ST = SV \cdot SY$



1. ▱ YSTW	1. Given
2. $\overline{SX} \perp \overline{YW}$	2. " "
3. $\overline{SV} \perp \overline{WT}$	3. " "
4. ∠1 and ∠2 are rt ∠'s	4. If 2 segs ⊥ → form rt ∠'s
5. $\angle Y \cong \angle T$	5. If ▱ → opp ∠s ≅
6. $\triangle YXS \sim \triangle TVS$	6. AA~
7. $\frac{SX}{SV} = \frac{SY}{ST}$	7. CSSTP
8. $SX \cdot ST = SV \cdot SY$	8. Means Extremes Thm

SHADOW PROBLEMS

6. While strolling one morning to get a little sun, Sean and Danny noticed that a 20-m flagpole cast a 25-m shadow. Nearby was a telephone pole that cast a 35-m shadow. How tall was the telephone pole?



$\frac{x}{20} = \frac{35}{25}$

$25x = 700$

$x = 28$

7. Maddie, who is 5 ½ feet tall, is standing 4 feet from a light post which is 22 feet tall. How long is Maddie's shadow? (*draw ONE picture only*)

$\frac{22}{5.5} = \frac{4+x}{x}$

$22x = 5.5(4+x)$

$22x = 22 + 5.5x$

$\frac{16.5x}{16.5} = \frac{22}{16.5}$

$x \approx 1.33$