

CSSTP

CSSTP:

If the triangles are similar (\sim), then all of the sides must be congruent proportional (create equal scale fractions).

Example:

$\triangle ABC \sim \triangle DEF$

Before you start your proof, it is important to plan!

Setup the three fractions:	Opp. $\angle A$ & $\angle D$ (skip A & D).	Opp. $\angle B$ & $\angle C$ (skip B & C).	Opp. $\angle C$ & $\angle F$ (skip C & F).
1st $\triangle \triangle ABC$	$\frac{ABC}{DEF} \rightarrow \frac{BC}{EF}$	$\frac{ABC}{DEF} \rightarrow \frac{AC}{DF}$	$\frac{ABC}{DEF} \rightarrow \frac{AB}{DE}$
2nd $\triangle \triangle DEF$			

$\triangle ABC \sim \triangle DEF$			Given
$\frac{BC}{EF} = \frac{AC}{DF}$	$\frac{BC}{EF} = \frac{AB}{DE}$	$\frac{AC}{DF} = \frac{AB}{DE}$	CSSTP

Multiplication Property of Equality:

The resulting step after a number, variable or object is multiplied to both sides of the equal sign.

Example:

Given: $\triangle RST \sim \triangle HJK$, $RS = 6$, $RT = 12$, $ST = 15$ & $HJ = 16$.

Prove: $JK = 40$

Plan first!

1st $\triangle \triangle RST$
2nd $\triangle \triangle HJK$

R&H	S&J	T&K
$\frac{ST}{JK}$	$\frac{RT}{HK}$	$\frac{RS}{HJ}$

Substitute:
 $ST=15$, $RT=12$, $RS=6$, & $HJ=16$

$\frac{15}{JK}$	$\frac{12}{HK}$	$\frac{6}{16}$
↑	↑	↑
want	don't want	have both

Use what you want & what you have:
 $\frac{ST}{JK} = \frac{RS}{HJ}$

Statements	Reasons
$\triangle RST \sim \triangle HJK$, $RS = 6$, $RT = 12$, $ST = 15$ & $HJ = 16$	Given
$\frac{ST}{JK} = \frac{RS}{HJ}$	CSSTP
$\frac{15}{JK} = \frac{6}{16}$	Subst.
$240 = 6(JK)$	Mult. Prop. =
$40 = JK$	Div. Prop. =
$JK = 40$	Sym. Prop. =

or

$\triangle RST \sim \triangle HJK$, $RS = 6$, $RT = 12$, $ST = 15$ & $HJ = 16$	Given
$\frac{ST}{JK} = \frac{RS}{HJ}$	CSSTP
$\frac{15}{JK} = \frac{6}{16}$	Subst.
$\frac{15}{JK} = \frac{3}{8}$	Simp.
$120 = 3(JK)$	Mult. Prop. =
$40 = JK$	Div. Prop. =
$JK = 40$	Sym. Prop. =

Example:

Given: $\triangle WYZ \sim \triangle KLM$, $WY = 3$, $WZ = 5$, $LM = 20$, & $KM = 25$

Prove: $KL = 15$

1st $\triangle \triangle WYZ$
2nd $\triangle \triangle KLM$

W&K	Y&L	Z&M
$\frac{YZ}{LM}$	$\frac{WZ}{KM}$	$\frac{WY}{KL}$

Substitute:
 $LM=20$, $WZ=5$, $WY=3$, & $KM=25$

$\frac{20}{YZ}$	$\frac{5}{WZ}$	$\frac{3}{KL}$
↑	↑	↑
don't want	have both	want

Use what you want & what you have:
 $\frac{WZ}{KM} = \frac{WY}{KL}$

Statements	Reasons
$\triangle WYZ \sim \triangle KLM$, $WY = 3$, $WZ = 5$, $LM = 20$, & $KM = 25$	Given
$\frac{WZ}{KM} = \frac{WY}{KL}$	CSSTP
$\frac{5}{25} = \frac{3}{KL}$	Subst.
$5(KL) = 75$	Mult. Prop. =
$KL = 15$	Div. Prop. =

or

$\triangle WYZ \sim \triangle KLM$, $WY = 3$, $WZ = 5$, $LM = 20$, & $KM = 25$	Given
$\frac{WZ}{KM} = \frac{WY}{KL}$	CSSTP
$\frac{5}{25} = \frac{3}{KL}$	Subst.
$\frac{1}{5} = \frac{3}{KL}$	Simp.
$KL = 15$	Mult. Prop. =

Name: _____

1.

Given: $\triangle ABC \sim \triangle FGH$, $AB = 12$, $BC = 15$, $AC = 9$ & $FG = 8$

Prove: $FH = 6$

Statements	Reasons

2.

Given: $\triangle PQR \sim \triangle GHJ$, $PQ = 25$, $QR = 20$, $GH = 20$, & $GJ = 8$

Prove: $HJ = 16$

Statements	Reasons

3.

Given: $\triangle STV \sim \triangle JKL$, $ST = 55$, $TV = 33$, $SV = 44$, & $JL = 32$

Prove: $KL = 24$

Statements	Reasons

Name: _____

4.

Given: $\triangle QRS \sim \triangle ZAB$, $QS = 8$, $ZA = 26$, $AB = 39$, & $ZB = 52$

Prove: $RS = 6$

Statements	Reasons

5.

Given: $\triangle DEF \sim \triangle NPQ$, $DE = 45$, $DF = 36$, $NP = 50$ & $PQ = 20$

Prove: $NQ = 40$

Statements	Reasons

6.

Given: $\triangle BCD \sim \triangle STV$, $CD = 6$, $ST = 12$, $TV = 8$ & $SV = 16$

Prove: $BC = 9$

Statements	Reasons

Name: _____

7.

Given: $\triangle ABC \sim \triangle PQR$, $BC = 6$, $AC = 12$, $PQ = 15$, & $PR = 18$
 Prove: $AB = 10$

Statements	Reasons

8.

Given: $\triangle VWY \sim \triangle STV$, $VW = 20$, $WY = 16$, $TV = 28$, & $SV = 42$
 Prove: $VY = 24$

Statements	Reasons

CSSTP Answers when *NOT* Simplifying the Fractions

1.

Statements	Reasons
$\triangle ABC \sim \triangle FGH$, $AB = 12$, $BC = 15$, $AC = 9$ & $FG = 8$	Given
$\frac{AB}{FG} = \frac{AC}{FH}$	CSSTP
$\frac{12}{8} = \frac{9}{FH}$	Subst.
$12(FH) = 72$	Mult. Prop. =
$FH = 6$	Div. Prop. =

Or with symmetric:

$\frac{AC}{FH} = \frac{AB}{FG}$	CSSTP
$\frac{9}{FH} = \frac{12}{8}$	Subst.
$72 = 12(FH)$	Mult. Prop. =
$6 = FH$	Div. Prop. =
$FH = 6$	Symm. Prop. =

2.

Statements	Reasons
$\triangle PQR \sim \triangle GHJ$, $PQ = 25$, $QR = 20$, $GH = 20$ & $GJ = 8$	Given
$\frac{PQ}{GH} = \frac{QR}{HJ}$	CSSTP
$\frac{25}{20} = \frac{20}{HJ}$	Subst.
$25(HJ) = 400$	Mult. Prop. =
$HJ = 16$	Div. Prop. =

Or with symmetric:

$\frac{QR}{HJ} = \frac{PQ}{GH}$	CSSTP
$\frac{20}{HJ} = \frac{25}{20}$	Subst.
$400 = 25(HJ)$	Mult. Prop. =
$16 = HJ$	Div. Prop. =
$HJ = 16$	Symm. Prop. =

3.

Statements	Reasons
$\Delta STV \sim \Delta JKL, ST = 55, TV = 33,$ $SV = 44 \text{ \& } JL = 32$	Given
$\frac{SV}{JL} = \frac{TV}{KL}$	CSSTP
$\frac{44}{32} = \frac{33}{KL}$	Subst.
$44(KL) = 1056$	Mult. Prop. =
$KL = 24$	Div. Prop. =

Or with symmetric:

$\frac{TV}{KL} = \frac{SV}{JL}$	CSSTP
$\frac{33}{KL} = \frac{44}{32}$	Subst.
$1056 = 44(KL)$	Mult. Prop. =
$24 = KL$	Div. Prop. =
$KL = 24$	Symm. Prop. =

4.

Statements	Reasons
$\Delta QRS \sim \Delta ZAB, QS = 8, ZA = 26,$ $AB = 39 \text{ \& } ZB = 52$	Given
$\frac{RS}{AB} = \frac{QS}{ZB}$	CSSTP
$\frac{RS}{39} = \frac{8}{52}$	Subst.
$52(RS) = 312$	Mult. Prop. =
$RS = 6$	Div. Prop. =

Or with symmetric:

$\frac{QS}{ZB} = \frac{RS}{AB}$	CSSTP
$\frac{8}{52} = \frac{RS}{39}$	Subst.
$312 = 52(RS)$	Mult. Prop. =
$6 = RS$	Div. Prop. =
$RS = 6$	Symm. Prop. =

5.

Statements	Reasons
$\Delta DEF \sim \Delta NPQ, DE = 45,$ $DF = 36, NP = 50 \text{ \& } PQ = 20$	Given
$\frac{DE}{NP} = \frac{DF}{PQ}$	CSSTP
$\frac{45}{50} = \frac{36}{PQ}$	Subst.
$45(NQ) = 1800$	Mult. Prop. =
$NQ = 40$	Div. Prop. =

Or with symmetric:

$\frac{DF}{NQ} = \frac{DE}{NP}$	CSSTP
$\frac{36}{NQ} = \frac{45}{50}$	Subst.
$1800 = 45(NQ)$	Mult. Prop. =
$40 = NQ$	Div. Prop. =
$NQ = 40$	Symm. Prop. =

6.

Statements	Reasons
$\Delta BCD \sim \Delta STV, CD = 6, ST = 12,$ $TV = 8 \text{ \& } SV = 16$	Given
$\frac{BC}{ST} = \frac{CD}{TV}$	CSSTP
$\frac{BC}{12} = \frac{6}{8}$	Subst.
$8(BC) = 72$	Mult. Prop. =
$BC = 9$	Div. Prop. =

Or with symmetric:

$\frac{CD}{TV} = \frac{BC}{ST}$	CSSTP
$\frac{6}{8} = \frac{BC}{12}$	Subst.
$72 = 8(BC)$	Mult. Prop. =
$9 = BC$	Div. Prop. =
$BC = 9$	Symm. Prop. =

7.

Statements	Reasons
$\Delta ABC \sim \Delta PQR, BC = 6,$ $AC = 12, PQ = 15 \text{ \& } PR = 18$	Given
$\frac{AB}{PQ} = \frac{AC}{PR}$	CSSTP
$\frac{AB}{15} = \frac{12}{18}$	Subst.
$18(AB) = 180$	Mult. Prop. =
$AB = 10$	Div. Prop. =

Or with symmetric:

$\frac{AC}{PR} = \frac{AB}{PQ}$	CSSTP
$\frac{12}{18} = \frac{AB}{15}$	Subst.
$180 = 18(AB)$	Mult. Prop. =
$10 = AB$	Div. Prop. =
$AB = 10$	Symm. Prop. =

8.

Statements	Reasons
$\Delta VWY \sim \Delta STV, VW = 20,$ $WY = 16, TV = 28 \text{ \& } SV = 42$	Given
$\frac{VY}{SV} = \frac{WY}{TV}$	CSSTP
$\frac{VY}{42} = \frac{16}{28}$	Subst.
$28(VY) = 672$	Mult. Prop. =
$VY = 24$	Div. Prop. =

Or with symmetric:

$\frac{WY}{TV} = \frac{VY}{SV}$	CSSTP
$\frac{16}{28} = \frac{VY}{42}$	Subst.
$672 = 28(VY)$	Mult. Prop. =
$24 = VY$	Div. Prop. =
$VY = 24$	Symm. Prop. =

CSSTP Answers when *Simplifying the Fractions (without symmetric)*

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