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CPCTC & CASTC Practice (Part 1)

Today, we are taking a break from writing proofs in order to focus on solving problems involving CPCTC and CASTC.

CPCTC	CASTC
<p>CPCTC shows that <u>all matching parts</u> on a set of congruent triangles will be congruent.</p> <p>Example: If $\triangle ABC \cong \triangle DEF$, then (by CPCTC)</p> <p>$\angle A \cong \angle D$ $\angle B \cong \angle E$ $\angle C \cong \angle F$ and also: $\overline{BC} \cong \overline{EF}$ $\overline{AC} \cong \overline{DF}$ $\overline{AB} \cong \overline{DE}$</p>	<p>CASTC shows that <u>all matching ANGLES</u> on a set of similar triangles will be congruent.</p> <p>Example: If $\triangle ABC \sim \triangle DEF$, then (by CASTC)</p> <p>$\angle A \cong \angle D$ $\angle B \cong \angle E$ $\angle C \cong \angle F$</p>

We will start by identifying all matching parts on several triangle sets.

<p>1. If $\triangle GHJ \cong \triangle KLM$, then (CPCTC):</p> <p>$\angle \cong \angle$ $\angle \cong \angle$ $\angle \cong \angle$ — — and also: — — \cong \cong \cong</p>	<p>2. If $\triangle NPQ \sim \triangle RST$, then (CASTC):</p> <p>$\angle \cong \angle$ $\angle \cong \angle$ $\angle \cong \angle$</p>	<p>3. If $\triangle VWY \cong \triangle ABZ$, then (_____):</p> <p>$\angle \cong \angle$ $\angle \cong \angle$ $\angle \cong \angle$ — — and also: — — \cong \cong \cong</p>
<p>4. If $\triangle CDE \cong \triangle FGH$, then (_____):</p> <p>$\angle \cong \angle$ $\angle \cong \angle$ $\angle \cong \angle$ — — and also: — — \cong \cong \cong</p>	<p>5. If $\triangle JKL \sim \triangle MNP$, then (_____):</p>	<p>6. If $\triangle QRS \cong \triangle TVW$, then (_____):</p>

For each triangle set below, determine the measure of the requested angle.

<p>Example: $\triangle NPQ \sim \triangle RST$, $m\angle N = 40^\circ$ & $m\angle S = 80^\circ$. Determine $m\angle T$.</p> <p><i>I'm looking for an angle, so I need to know my angle pairs (CASTC):</i> $\angle N \cong \angle R$, $\angle P \cong \angle S$, & $\angle Q \cong \angle T$</p> <p><i>I don't know $m\angle Q$, so I can't use it to find $m\angle T$ yet, but I have information about the other two angle sets:</i> $m\angle N = m\angle R$, $m\angle P = m\angle S$ $40 = m\angle R$, $m\angle P = 80$</p> <p><i>I can use triangle sum. I want T, so I'll use triangle RST:</i> $m\angle R + m\angle S + m\angle T = 180$ $40 + 80 + m\angle T = 180$ $120 + m\angle T = 180$ $m\angle T = 60^\circ$</p>	<p>Example: $\triangle ADE \cong \triangle HKL$, $m\angle A = 50^\circ$ & $m\angle K = 30^\circ$. Determine $m\angle D$.</p> <p><i>I'm looking for an angle, so I need to know my angle pairs (CPCTC):</i> $\angle A \cong \angle H$, $\angle D \cong \angle K$, & $\angle E \cong \angle L$</p> <p><i>I know K, so I can use it to find D:</i> $m\angle D = m\angle K$ $m\angle D = 30^\circ$</p>	<p>Example: $\triangle MPS \cong \triangle TVY$, $MS = 11$ & $MP = 5$. Determine TY.</p> <p><i>I'm looking for a side, so I need to know my side pairs (CPCTC). If you have trouble figuring out which sides should be put together, write the first triangle name on top of the other triangle name to line them up.</i></p> <p>$\triangle \overline{MP} \overline{PS}$ $\triangle \overline{M} \overline{PS}$ $\triangle \overline{M} \overline{P} \overline{S}$ $\triangle \overline{TV} \overline{Y}$ $\triangle \overline{T} \overline{VY}$ $\triangle \overline{T} \overline{V} \overline{Y}$</p> <p>$\overline{MP} \cong \overline{TV}$, $\overline{PS} \cong \overline{VY}$, & $\overline{MS} \cong \overline{TY}$</p> <p><i>I know MS, so I can use it to find TY:</i> $MS = TY$ $11 = TY$ $TY = 11$</p>
<p>7. $\triangle SGV \sim \triangle WTD$, $m\angle S = 87^\circ$ & $m\angle G = 43^\circ$. Determine $m\angle T$.</p>	<p>8. $\triangle JDQ \cong \triangle ZKH$, $JD = 4$ & $JQ = 7$. Determine ZH.</p>	<p>9. $\triangle NMY \cong \triangle PBE$, $m\angle N = 100^\circ$ & $m\angle B = 16^\circ$. Determine $m\angle E$.</p>

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10. $\triangle ARL \cong \triangle DZN$, $m\angle R = 32^\circ$ & $m\angle N = 46^\circ$. Determine $m\angle A$.	11. $\triangle VQP \sim \triangle BLM$, $m\angle V = 55^\circ$ & $m\angle Q = 35^\circ$. Determine $m\angle L$.	12. $\triangle SCH \cong \triangle WRE$, $WR = 7$ & $RE = 2$. Determine CH .
13. $\triangle FTA \cong \triangle KTE$, $TE = 3$ & $KE = 4$. Determine TA .	14. $\triangle GQM \cong \triangle SBN$, $m\angle G = 15^\circ$ & $m\angle M = 35^\circ$. Determine $m\angle N$.	15. $\triangle PKA \sim \triangle CHU$, $m\angle P = 86^\circ$ & $m\angle H = 31^\circ$. Determine $m\angle A$.

<p>Example: $\triangle NPQ \cong \triangle RST$, $m\angle N = (3x + 6)^\circ$, $m\angle Q = (5x - 4)^\circ$ & $m\angle T = (4x + 8)^\circ$. Determine $m\angle T$.</p> <p><i>I'm looking for an angle, so I need to know my angle pairs (CASTC):</i> $\angle N \cong \angle R$, $\angle P \cong \angle S$, & $\angle Q \cong \angle T$</p> $m\angle Q = m\angle T$ $5x - 4 = 4x + 8$ <p><i>I can use properties of equality to solve for x:</i></p> $5x - 4 = 4x + 8$ $x - 4 = 8$ $x = 12$ <p><i>Substitute to determine $m\angle T$:</i></p> $m\angle T = 4(12) + 8$ $\boxed{m\angle T = 56^\circ}$	16. $\triangle ABC \cong \triangle DEF$, $m\angle A = (3x + 7)^\circ$, $m\angle B = (4x)^\circ$ & $m\angle D = (6x - 14)^\circ$. Determine $m\angle D$.	17. $\triangle GHJ \sim \triangle KLM$, $m\angle H = (5x + 2)^\circ$, $m\angle J = (4x + 1)^\circ$ & $m\angle L = (8x - 7)^\circ$. Determine $m\angle L$.
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Triangle Proof Practice (Part 1) Answers

1. $\angle G \cong \angle K$, $\angle H \cong \angle L$, $\angle J \cong \angle M$ $\overline{GH} \cong \overline{KL}$, $\overline{HJ} \cong \overline{LM}$, $\overline{GJ} \cong \overline{KM}$	2. $\angle N \cong \angle R$, $\angle P \cong \angle S$, $\angle Q \cong \angle T$ (NO SIDES!!!)	3. CPCTC $\angle V \cong \angle A$, $\angle W \cong \angle B$, $\angle Y \cong \angle Z$ $\overline{VW} \cong \overline{AB}$, $\overline{VY} \cong \overline{AZ}$, $\overline{WY} \cong \overline{BZ}$
4. CPCTC $\angle C \cong \angle F$, $\angle D \cong \angle G$, $\angle E \cong \angle H$ $\overline{CD} \cong \overline{FG}$, $\overline{DE} \cong \overline{GH}$, $\overline{CE} \cong \overline{FH}$	5. CASTC $\angle J \cong \angle M$, $\angle K \cong \angle N$, $\angle L \cong \angle P$	6. CPCTC $\angle Q \cong \angle T$, $\angle R \cong \angle V$, $\angle S \cong \angle W$ $\overline{QR} \cong \overline{TV}$, $\overline{RS} \cong \overline{VW}$, $\overline{QS} \cong \overline{TW}$
7. $m\angle T = 43^\circ$	8. $ZH = 7$	9. $m\angle E = 64^\circ$
10. $m\angle A = 102^\circ$	11. $m\angle L = 38^\circ$	12. $CH = 2$
13. $TA = 3$	14. $m\angle N = 35^\circ$	15. $m\angle A = 63^\circ$
16. $m\angle D = 28^\circ$	17. $m\angle L = 17^\circ$	