10. Dilate $\triangle XYZ$ by scale factor $\frac{TU}{XY}$. The image $\triangle X'Y'Z'$ is congruent to $\triangle TUV$ by SAS, so there is a rigid motion that maps $\triangle X'Y'Z'$ to $\triangle TUV$. Since the composition of a dilation and rigid motion maps $\triangle XYZ$ to $\triangle TUV$, $\triangle X'Y'Z' \sim \triangle TUV$.

11. **a.** $\triangle NLM$; $\frac{AB}{NL} = \frac{BC}{LM} = \frac{AC}{NM}$, so ABC~NLM by SSS~.

b. $\triangle TSR$; $\angle A \cong \angle T$, $\angle B \cong \angle S$, so $\triangle ABC \sim \triangle TSR$ by AA~.

12. If the triangles are congruent by ASA, then they have two pairs of congruent angles. That meets the conditions for the AA~ Similarity Theorem, so the triangles are similar.

13. Russell assumed that either $\angle K$ or $\angle M$ has a measure of 60° which is only true if the triangles are similar, which has not yet been proven. $\angle K$ could measure 59° and $\angle M$ could measure 41°, and the triangles would not be similar.

14. Dilate $\triangle LMN$ by a factor of $\frac{QR}{LM}$. The image $\triangle L'M'N'$ is congruent to $\triangle QRS$ by ASA, so there is a rigid motion that maps $\triangle L'M'N'$ to $\triangle QRS$. Since the composition of a dilation and rigid motion maps $\triangle LMN$ to $\triangle QRS$, $\triangle LMN \sim \triangle QRS$.

15. Because there is no Side-Side-Angle Congruence Criteria, it cannot be shown that a dilated triangle is necessarily congruent to a triangle where the two pairs of corresponding sides are proportional and a non-included pair of angles is congruent.

16. No; Since no angle measurements are given, we can only prove triangle by similarity by the SSS~ Similarity Theorem.

$\frac{AB}{DE} = \frac{BC}{EF} = \frac{2}{3}$, but $\frac{AC}{DF} \neq \frac{2}{3}$, so $\triangle ABC$ and $\triangle DEF$ are not similar.

17. Yes; $\angle K = 180^\circ - 60^\circ - 40^\circ = 80^\circ$, so $\angle K \cong \angle Q$ and $\angle J \cong \angle P$; thus $\triangle JKL \sim \triangle PQR$ by AA~.

18. Yes; $\angle Y = 180^\circ - 50^\circ - 22^\circ = 108^\circ$ and $\frac{ST}{XY} = \frac{TU}{YZ} = \frac{3}{4}$, so $\triangle STU \sim \triangle XYZ$ by SAS~.

19. $FG = 2.8$; Since $\triangle EFG \sim \triangle LMN$ by ~AA, solve for FG.

$$\frac{FG}{EF} = \frac{LM}{MN}$$
$$\frac{FG}{4} = \frac{3.5}{5}$$
$$FG = 4 \cdot \frac{3.5}{5}$$
$$FG = 2.8$$

20. $x = 33.8$; Since $180^\circ - 67^\circ - 67^\circ = 46^\circ$, the triangles are similar by ~AA. Solve for x.

$$\frac{x}{26} = \frac{26}{20}$$
$$x = 26 \cdot \frac{26}{20}$$
$$x = 33.8$$

21. Dilate $\triangle ABC$ by a factor of $\frac{EF}{AB}$. The image $\triangle A'B'C'$ is congruent to $\triangle EFG$ by SSS, so there is a rigid motion that maps $\triangle A'B'C'$ to EFG. Since the composition of a dilation and rigid motion maps $\triangle ABC$ to EFG, $\triangle ABC \sim EFG$.