2. Two triangles that are **similar** have two pairs of corresponding congruent angles.

3. A **similarity transformation** is a composition of a dilation and one or more rigid motions.

4. A point that is its own image in a dilation is the **center of dilation.**

5. As a result of a dilation, if $A'B' = n \cdot AB$, then n is the **scale factor.**

6. $F'(2.5,\ -1)$, $G'(-1,\ -2)$, $H'(0,\ 3)$;

   Multiply each coordinate of the preimage point by $\frac{1}{2}$ to find the coordinates of the image points.

   $F(5,-2) \to F'\left(5 \cdot \frac{1}{2}, -2 \cdot \frac{1}{2}\right) = F'(2.5,-1)$

   $G(-2,-4) \to G'\left(-2 \cdot \frac{1}{2}, -4 \cdot \frac{1}{2}\right) = G'(-1,-2)$

   $H(0,6) \to H'\left(0 \cdot \frac{1}{2}, 6 \cdot \frac{1}{2}\right) = H'(0,3)$

7. $K'(0,\ 4)$, $L'(9,\ -8)$, $M'(-6,\ 4)$;

Preimage Point	Distance from $K(0, 4)$		Triple Distances from $K(0, 4)$		Add to $K(0, 4)$	Image Point
	Horizontal	Vertical	Horizontal	Vertical		
$K(0,4)$	0	0	0	0	$(0+0, 0+4)$	$K'(0,\ 4)$
$L(3,0)$	3	−4	9	−12	$(9+0, -12+4)$	$L'(9,\ -8)$
$M(-2,4)$	−2	0	−6	0	$(-6+0, 0+4)$	$M'(-6,\ 4)$

8. $R_m \circ D_{\frac{1}{3}}$ where m is the line with equation $y = -\frac{1}{2}$. Reflect $PQRS$ over the line $y = -\frac{1}{2}$, and then since $YX = \frac{1}{3}QR$ and $ZY = \frac{1}{3}SR$, dilate the reflection by $\frac{1}{3}$.

9. No; the scale factor is ratio of a side length $\triangle PQR$ to the corresponding side length $\triangle ABC$, so the scale factor is $\frac{PQ}{AB} = \frac{5}{10} = \frac{1}{2}$.

10. $\frac{FG}{JG} = \frac{9}{6} = \frac{3}{2}$ and $\frac{GJ}{GH} = \frac{6}{4} = \frac{3}{2}$, so $\frac{FG}{JG} = \frac{GJ}{GH}$. $m\angle FGJ = m\angle JGH = 90^\circ$, so $\angle FGJ \cong \angle JGH$. Thus, $\triangle FGJ \sim \triangle JGH$ by SAS $\sim$.

11. $\frac{KL}{NL} = \frac{2}{4} = \frac{1}{2}$, $\frac{LN}{LM} = \frac{4}{8} = \frac{1}{2}$, and $\frac{KN}{NM} = \frac{3}{6} = \frac{1}{2}$, so $\frac{KL}{NL} = \frac{LN}{LM} = \frac{KN}{NM}$. Thus $\triangle KLN \sim \triangle NLM$ by SSS ~.

12. Since $m\angle U = 180^\circ - m\angle T - m\angle V = 78^\circ$, $\angle U \cong \angle Z$. So, triangle similarity can be shown by AA ~ if $m\angle X = m\angle T = 37^\circ$ or if $m\angle Y = m\angle V = 65^\circ$.

13. $RS = 8$; $\triangle RST$ ~ $\triangle RSU$ by Theorem 7-4, so a proportion of the corresponding legs can be used. Use Corollary 1 to solve for RS.

$$\frac{RS}{RU} = \frac{RT}{RS}$$
$$\frac{RS}{4} = \frac{4+12}{RS}$$
$$RS^2 = 64$$
$$RS = 8$$

14. $ST = 8\sqrt{3}$; $\triangle RST$ ~ $\triangle RSU$ by Theorem 7-4, so a proportion of the corresponding legs can be used. Use Corollary 1 to solve for ST.

$$\frac{ST}{RS} = \frac{SU}{RU}$$
$$\frac{ST}{8} = \frac{SU}{4}$$
$$\frac{ST}{8} = \frac{\left(4\sqrt{3}\right)}{4}$$
$$ST = 8\sqrt{3}$$

15. $SU = 4\sqrt{3}$; $\triangle RSU$ ~ $\triangle TSU$ by Theorem 7-4, so a proportion of the corresponding legs can be used. Use Corollary 2 to solve for SU.

$$\frac{SU}{RU} = \frac{TU}{SU}$$
$$\frac{SU}{4} = \frac{12}{SU}$$
$$SU^2 = 48$$
$$SU = 4\sqrt{3}$$

16. $x = 48$; Apply the Side-Splitter Theorem to solve for x.

$$\frac{x}{32} = \frac{30}{20}$$
$$x = 32 \cdot \frac{30}{20}$$
$$x = 48$$

17. $x = 14.4$; Apply the Corollary to the Side-Splitter Theorem to solve for x.

$$\frac{x}{18} = \frac{16}{20}$$
$$x = 18 \cdot \frac{16}{20}$$
$$x = 14.4$$

18. $x = 4$; Use the Triangle-Angle-Bisector Theorem to solve for x.

$$\frac{x}{8} = \frac{2.5}{5}$$
$$x = 8 \cdot \frac{2.5}{5}$$
$$x = 4$$

19. $x = 3$; Use the Triangle-Angle-Bisector Theorem to solve for x.

$$\frac{x}{9} = \frac{(5-x)}{6}$$
$$6x = 9\,(5 - x)$$
$$6x = 45 - 9x$$
$$15x = 45$$
$$x = 3$$

20. GK and GH; By the similarity $\triangle GHJ \cong \triangle GJK$, $\frac{GH}{GJ} = \frac{GJ}{GK}$.