**LEARNING TARGETS**

- I can use SSS~ and SAS~ to show that triangles are similar.
- I can use SSS~ and SAS~ to find side lengths and angle measures.

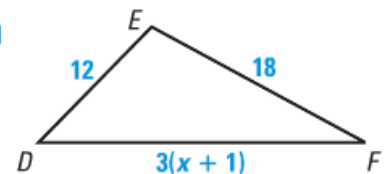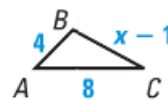| Theorem Name	What it says…	Example with explanation
Side-Side-Side Similarity SSS~	If the three sides of one triangle are proportional to the three sides of another triangle, then the triangles are similar. (Check to see if the ratios of the three corresponding sides are the same, if they are, the reduced fraction is your scale factor and the triangles are similar!)	 $\dfrac{short}{short}, \dfrac{medium}{medium}, \dfrac{long}{long} \Rightarrow$ —— , —— , —— the three fractions reduce to —— $\triangle ABC : \triangle DEF$ by SSS : with scale factor ——

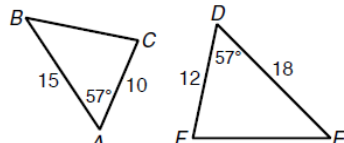✓ **I can use SSS~ to identify similar triangles.**

1. Is either $\triangle RST$ or $\triangle XYZ$ similar to $\triangle ABC$?
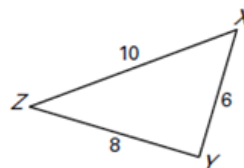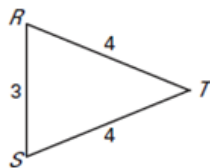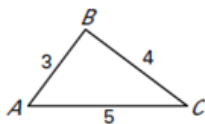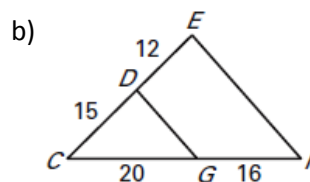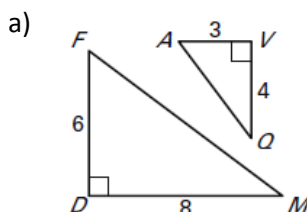

✓ **I can use SSS~ to solve problems.**

1. Find the value of x that makes $\triangle ABC \sim \triangle DEF$ then find the missing side lengths.

|	If two sides of one triangle are proportional to two sides of another triangle and their included angles are congruent, then the triangles are similar. (Check to see if the ratios of two pairs of corresponding sides reduce to the same fraction and that the angles that joins the two sides are congruent)	 $\dfrac{short}{short}, \dfrac{long}{long} \Rightarrow \dfrac{\quad}{\quad}, \dfrac{\quad}{\quad}$ both fractions reduce to —— and their included angles are both $57°$ $\triangle ABC : \triangle DEF$ by $SAS :$ with scale factor ——
Side-Angle-Side Similarity SAS~		

✓ **I can use SAS~ to identify similar triangles.**

1. Are the triangles similar? If so, write a similarity statement and state the similarity postulate or theorem that justifies your answer.

   a)

   b)

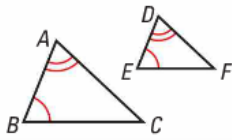✓ **I can use SAS~ to solve problems.**

1. Find the value of x that makes $\triangle PQR \sim \triangle TSR$ the find the missing side lengths.
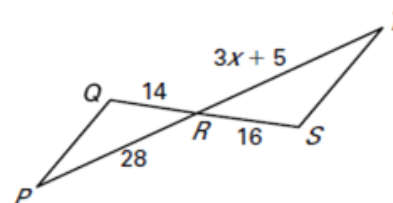
2. Find the value of m that makes $\triangle ABC \sim \triangle DEF$ when $AB = 3$, $BC = 4$, $DE = 2m$, $EF = m + 5$ and $\angle B \cong \angle E$
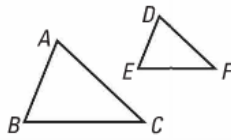
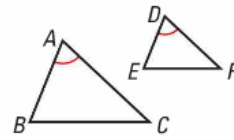**Triangle Similarity Postulate and Theorems**

AA Similarity Postulate   **SSS Similarity Theorem**   **SAS Similarity Theorem**

If $\angle A \cong \angle D$ and $\angle B \cong \angle E$, then $\triangle ABC \sim \triangle DEF$.

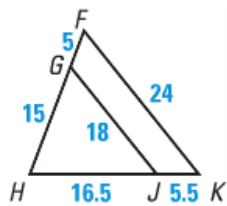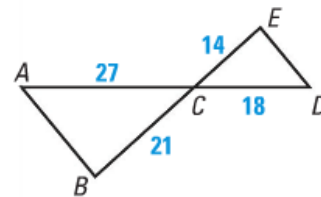If $\dfrac{AB}{DE} = \dfrac{BC}{EF} = \dfrac{AC}{DF}$, then $\triangle ABC \sim \triangle DEF$.

If $\angle A \cong \angle D$ and $\dfrac{AB}{DE} = \dfrac{AC}{DF}$, then $\triangle ABC \sim \triangle DEF$.

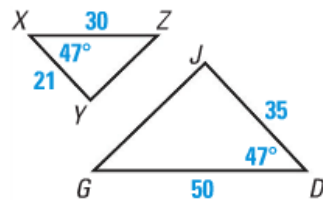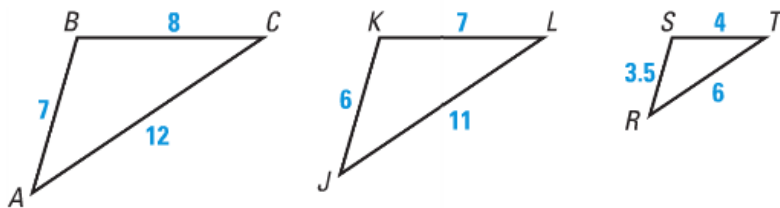✓ **Show that the triangles are similar and write a similarity statement. *Explain* your reasoning.**

1.

2.

3.

1. Is either ΔLMN or ΔRST similar to ΔABC ? If so, state the scale factor.

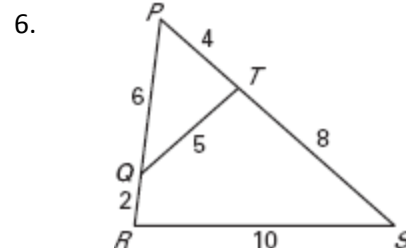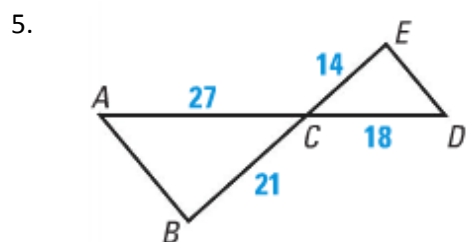2. Is either ΔJKL or ΔRST similar to ΔABC ? If so, state the scale factor.

Determine whether the two triangles are similar. If they are similar, write a similarity statement and find the scale factor of __Triangle B__ __to__ __Triangle A.__

3.

Not drawn to scale

4.

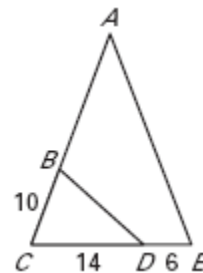**Show that the triangles are similar and write a similarity statement.**

5.

6.
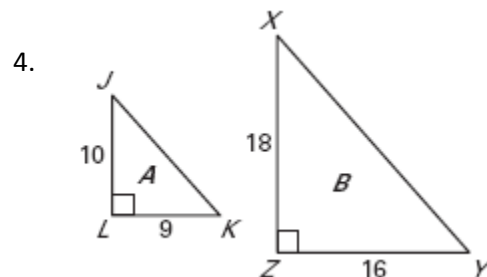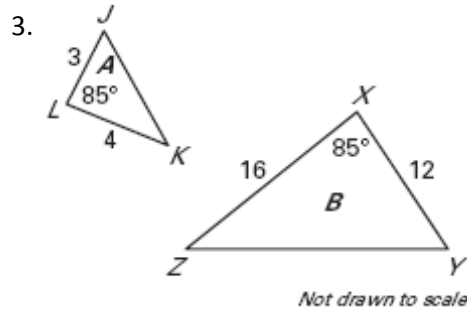
7. Find the value of m that makes $\triangle ABC \sim \triangle DEF$ when AB = 3, BC = 4, DE = 2m, EF = m + 5, and $\angle B \cong \angle E$. Include a sketch.

8. Find the value of n that makes $\triangle PQR \sim \triangle XYZ$ when PQ = 4, QR = 5, XY = 4n + 4, YZ = 7n − 1 and $\angle Q \cong \angle Y$. Include a sketch.

9. In the diagram at the right, $\triangle ACE \sim \triangle DCB$. Find the length of AB.

A. 12   B. 18

C. $\dfrac{35}{2}$ D. $\dfrac{30}{7}$

Sketch the triangles using the given description. Explain whether the two triangles can be similar. If they are, state the reason why they are similar.

10. The side lengths of ΔABC are 8, 10 and 14.
    The side lengths of ΔDEF are 16, 20 and 26.

11. In ΔABC, AB = 15, BC = 24 and m∠B = 38°.
    In ΔDEF, DE = 5, EF = 8, and m∠E = 38°.

Pine Tree In order to estimate the height *h* of a tall pine tree, a student places a mirror on the ground and stands where she can see the top of the tree, as shown. The student is 6 feet tall and stands 3 feet from the mirror which is 11 feet from the base of the tree.

12. What is the height *h* (in feet) of the pine tree?

13. Another student also wants to see the top of the tree.
    The other student is 5.5 feet tall. If the mirror is to remain
    3 feet from the student's feet, how far from the base of the
    tree should the mirror be placed?
Answer Key :
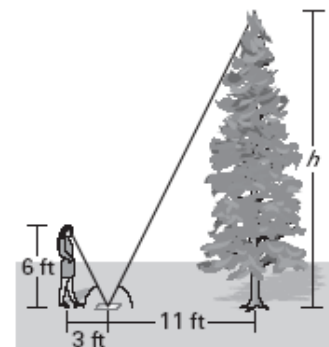
1.) ΔLMN , Scale $\dfrac{1}{2}$ or 1 : 2

2) ΔRST , Scale $\dfrac{1}{2}$ or 1 : 2

3) Yes, $\Delta ZXY : \Delta KLJ$, Scale : $\dfrac{4}{1}$ or 4 : 1

4) Not Similar

5) $\Delta ACB : \Delta DCE$ by SAS Similarity. Scale : $\dfrac{3}{2}$ or 3 : 2

6) $\Delta TPQ : \Delta RPL$ by SSS Similarity. Scale : $\dfrac{1}{2}$ or 1 : 2

7) m = 3

8) n = 3

9) B

10) Not Similar

11) Yes, $\Delta ABC : \Delta DEF$ by SAS Similarity

12) 22 feet

13) 12 feet