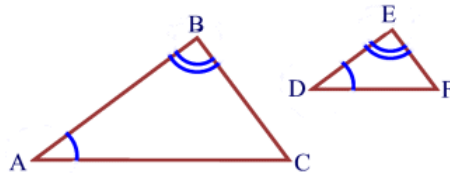## 7C – Similarity

❖ **Vocabulary, Formulas, Theories:**
- **Similar Figures:** figures that are the same shape but not necessarily the same size.
- **Scale Factor**: the ratio of corresponding sides of similar figures.
- **Angle Angle Similarity (AA~):** If two angles of one triangles are congruent to two angles of another triangle, the triangles are similar.
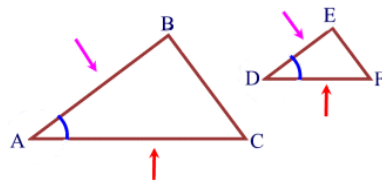

If: $\angle A \cong \angle D$
$\angle B \cong \angle E$
Then: $\triangle ABC \sim \triangle DEF$

- **Side Angle Side Similarity (SAS~):** If an angle of one triangle is congruent to the corresponding angle of another triangle and the length of the sides including these angles are in proportion, the triangles are similar.
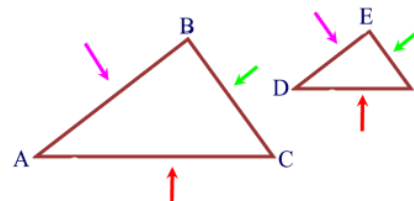

If: $\angle A \cong \angle D$
$\dfrac{AB}{DE} = \dfrac{AC}{DF}$
Then: $\triangle ABC \sim \triangle DEF$

- **Side Side Side Similarity (SSS~):** If the three sets of corresponding sides of two triangles are in proportion, the triangles are similar.
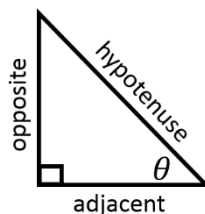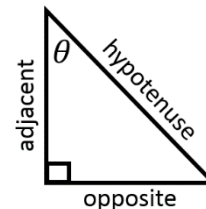

If: $\dfrac{AB}{DE} = \dfrac{AC}{DF} = \dfrac{BC}{EF}$
Then: $\triangle ABC \sim \triangle DEF$

- **Trigonometric Ratios**: ratios that are created using trigonometric functions and a right triangle.

$$sin\theta = \frac{opposite}{hypotenuse} \qquad cos\theta = \frac{adjacent}{hypotenuse} \qquad tan\theta = \frac{opposite}{adjacent}$$

- The "opposite" side and "adjacent "side depend on the location of the angle.
- The hypotenuse is always across from the 90 degree angle.

- **SOHCAHTOA**: a term used to help recall how to set up trigonometric ratios.
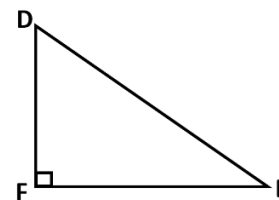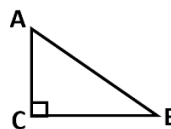
$$SOHCAHTOA$$
$$Soh\ Cah\ Toa$$

$$S = \frac{o}{h} \qquad C = \frac{a}{h} \qquad T = \frac{o}{a}$$

$$Sin\theta = \frac{Opp}{Hyp} \qquad Cos\theta = \frac{Adj}{Hyp} \qquad Tan\theta = \frac{Opp}{Adj}$$
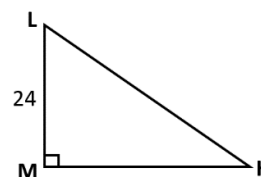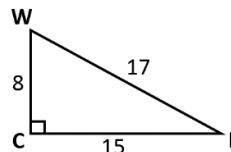
EX1) If $\triangle ABC \sim \triangle DEF$, choose the expression that is equivalent to $\cos(A)$: Is it $\sin(D)$ or $\sin(E)$? Explain.

EX2) Use $\triangle WCE \sim \triangle LMH$ to determine the value of the trigonometric expressions.
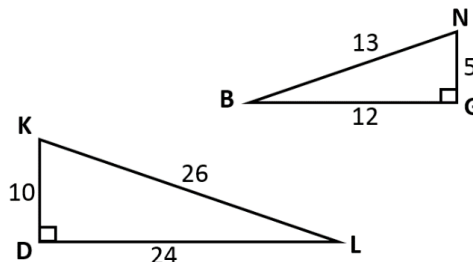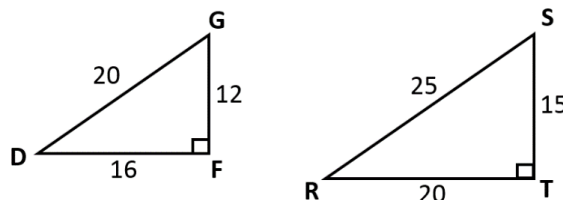
   a) $\cos(L)$ b) $\cos(H)$

EX3) Find the cosine ratios of the corresponding non-right angles for $\triangle KDL$ and $\triangle NGB$. Compare the ratios to draw a conclusion.

EX4) Prove that $\cos(G)$ and $\cos(S)$ are equivalent.

EX5) Solve for the missing variables and determine if $\cos(\angle DEA) = \cos(\angle CBA)$.