Warm Up

Complete the following missing information if $\triangle ABC \sim \triangle DEF$.

- $\angle A \sim \angle D = 37^\circ$
- $\angle C \sim \angle F = 55^\circ$

\[ \begin{align*}
15 + 22 &= 37 \\
3(15) + 10 &= 55
\end{align*} \]

\[ \begin{align*}
88 + x + 22 + 3x + 10 &= 180 \\
4x + 120 &= 180 \\
-120 &= -120 \\
\frac{4x}{4} &= \frac{60}{4} \\
x &= 15
\end{align*} \]
PARALLEL LINES & TRANSVERSALS

Essential Question: What are the types of angles formed by a transversal and parallel lines?
Parallel Lines Cut By A Transversal
Guided Notes

Definitions:

- **Parallel Lines:** Two lines that never intersect. *(cross)*
- **Transversal:** A line that intersects two or more lines.

When parallel lines are intersected by a transversal, *many angles are formed.*

They will form special relationships between pairs.
Reminder: Supplementary angles are two angles that add up to 180°. They make a straight line.

1. Name the parallel lines.
   \[ \vec{m} \text{ and } \vec{n} \]

2. Name the transversal.
   \[ \vec{p} \]

The order the angles are numbered isn’t important, that can change from problem to problem...
What stays the same is their relationship!
3. Name and highlight the **vertical** angles.

- **Vertical angles are congruent**

\[ \angle 1 \cong \angle 4 \]
\[ \angle 2 \cong \angle 3 \]
\[ \angle 5 \cong \angle 8 \]
\[ \angle 6 \cong \angle 7 \]

*Tip* basically means opposite from each other, across the vertex, not adjacent/next to
4. Name and highlight the **corresponding** angles.

- **Corresponding angles are congruent**

\[ \angle 1 \cong \angle 5 \]
\[ \angle 2 \cong \angle 6 \]
\[ \angle 3 \cong \angle 7 \]
\[ \angle 4 \cong \angle 8 \]

*TIP* think which ones ‘match up’ in the same location? like top left corner with top left corner
5. Name and highlight the **alternate interior** angles.

- Alternate Interior angles are congruent

\[ \angle 3 \cong \angle 6 \]
\[ \angle 4 \cong \angle 5 \]

*Tip* think **alternate** means on **opposite** sides of the transversal, and **Interior** means **inside** of the ‘track’ (parallel lines)
6. Name and highlight the alternate exterior angles.

- Alternate exterior angles are congruent

\[ \angle 1 \cong \angle 8 \]
\[ \angle 2 \cong \angle 7 \]

*TIP* think alternate means on opposite sides of the transversal, and exterior means outside of the 'track' (parallel lines)
7. Name and highlight the \textbf{same side interior} angles.

- \textbf{Same side interior angles are supplementary}

\[ \angle 3 \text{ and } \angle 5 \text{ are supp.} \]

\[ \angle 4 \text{ and } \angle 6 \text{ are supp.} \]

*\text{TIP}: think \textit{same-side means on the same sides of the transversal, and Interior means inside of the ‘track’ (parallel lines)}*
8. Name and highlight the **same side exterior** angles.

- **Same side exterior angles are supplementary**

\[\angle 1 \text{ and } \angle 7 \text{ are supp.}\]

\[\angle 2 \text{ and } \angle 8 \text{ are supp.}\]

*TIP* think **same-side** means on the **same sides** of the transversal, and **Exterior** means **outside** of the ‘track’ (parallel lines)
If you know the measure of one of the 8 angles, you can find the measure of all of the others.

Try it. The measure of $\angle 1 = 120^\circ$.

*notice all the acute angles in the problem will be $60^\circ$ and all the obtuse angles in the problem will be $120^\circ$*
If you know the measure of one of the 8 angles, you can find the measure of all of the others.

Try it again. The measure of $\angle 1 = 72^\circ$.

$\angle 1 = 72^\circ$
$\angle 2 = 108^\circ$
$\angle 3 = 72^\circ$
$\angle 4 = 108^\circ$
$\angle 5 = 108^\circ$
$\angle 6 = 72^\circ$
$\angle 7 = 108^\circ$
$\angle 8 = 72^\circ$