Name _____

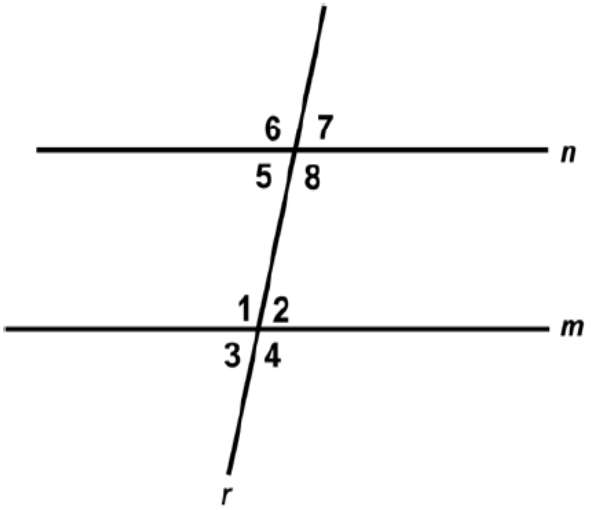
Lesson 12a: Digging Deeper into Parallel Lines and Proofs

Warm Up

LEARNING TARGET

I CAN use geometric facts about parallel lines to prove other geometric facts.

***Exercise* #1:** In the following diagram, lines m and n are parallel ($m \| n$) and are cut by **transversal** line r. Angles have been numbered to make identifying them easier.

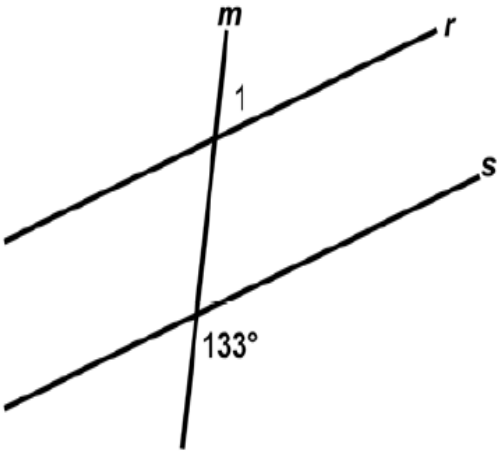


(a) Give all **corresponding angle pairs.** What is true about their measures?

(b) Give all **alternate interior angle pairs**. What is true about their measures?

Mini Lesson

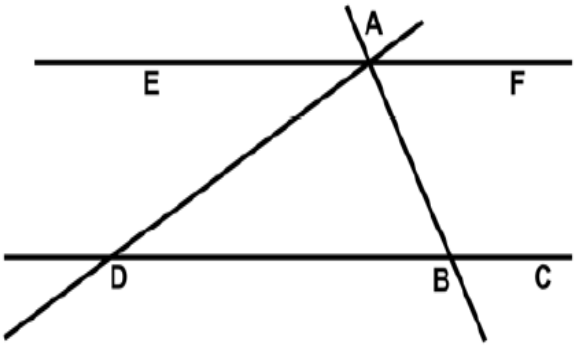
***Exercise* #2:** In the diagram below, $r \| s$ and are cut by transversal m. Explain why $m\angle 1 = 47°$.



***Exercise* #3:** In the diagram shown, $\overline{EF} \parallel \overline{DC}$, $m\angle ABC = 112^\circ$ and $m\angle EAD = 24^\circ$. Which of the following represent the measure of $\angle DAB$?

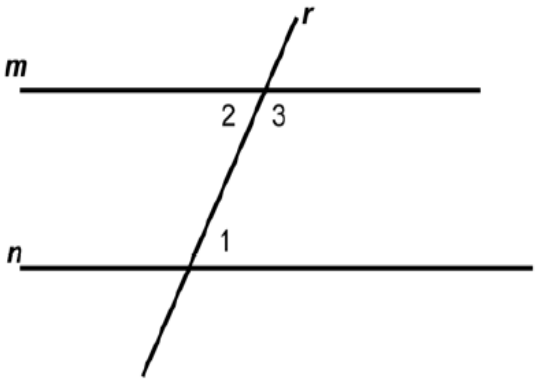
(1) 24° (3) 88°

(2) 44° (4) 112°



***Exercise* #4:** In the following diagram lines m and n are parallel and cut by straight line transversal r. Angles are numbered as shown.

Prove: $\angle 1$ and $\angle 3$ are supplementary



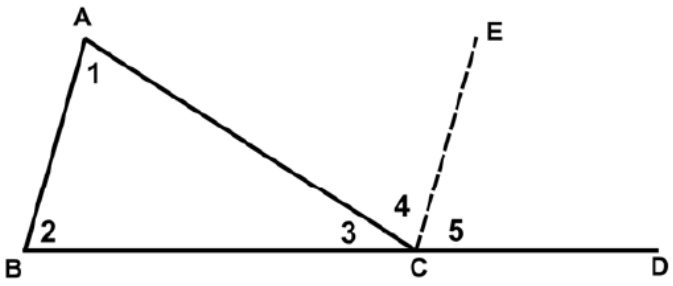
Make a plan:

SHOW:

STATEMENT	REASON

***Exercise* #5:** In the following diagram, ΔABC has been drawn and side $\overline{BC}$ has been extended to point D. Point E has been located such that **auxiliary** segment $\overline{CE}$ is parallel to $\overline{AB}$.

Given that $\overline{AB} \parallel \overline{CE}$:



a. What angle must be equal in measure to $\angle 1$? Why?

b. What angle must be equal in measure to $\angle 2$? Why?

Prove: $\boldsymbol{m\angle 1 + m\angle 2 + m\angle 3 = 180°}$ **SHOW:**

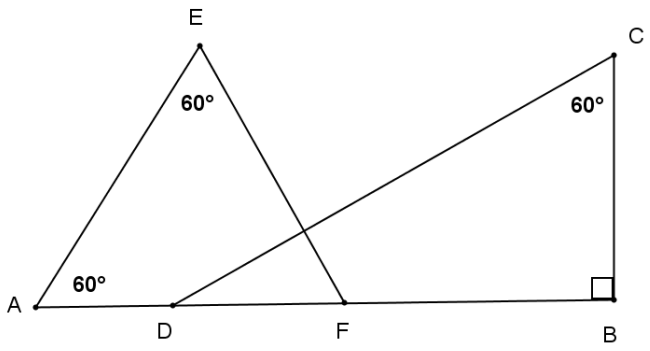
Make a plan:

STATEMENT	REASON

Work Time

1. Given the diagram below:

Prove: $\overline{DC} \perp \overline{EF}$.



Make a plan that can be used to write the proof:

(What geometric facts are relevant?)

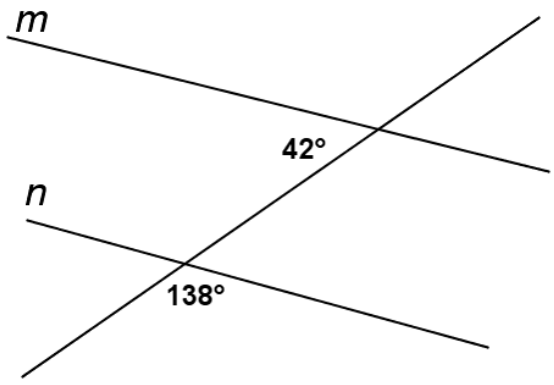
SHOW:

Write out your proof:

STATEMENT	REASON

2. In the diagram below, prove that $m \parallel n$. Make a plan:

SHOW:

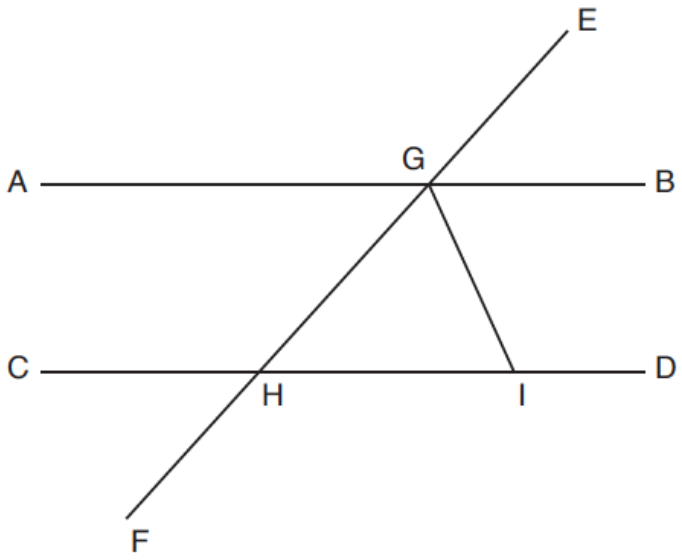


Write out your proof:

STATEMENT	REASON

(from the June 2017 Geometry Regents)

32 In the diagram below, $\overline{EF}$ intersects $\overline{AB}$ and $\overline{CD}$ at G and H, respectively, and $\overline{GI}$ is drawn such that $\overline{GH} \cong \overline{IH}$.



If $m\angle EGB = 50°$ and $m\angle DIG = 115°$, explain why $\overline{AB} \parallel \overline{CD}$.