Date ___________________ Foundations Math 11

2.2.2: Parallel Lines & Deductive Reasoning

Curricular Competencies

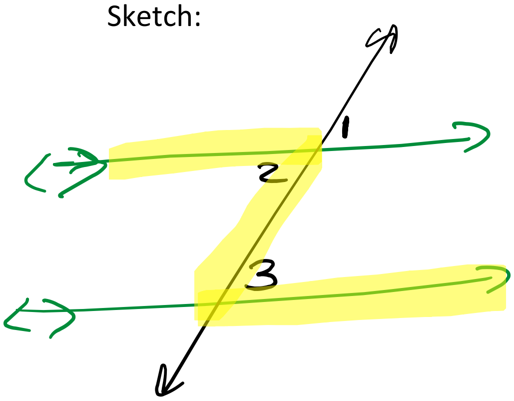
B3: I can apply flexible and strategic approaches to problems
C1: I can explain and justify math ideas and decisions

We have been using deductive reasoning to find missing angles in diagrams. Sometimes, mathematicians use deductive reasoning in the form of a guided proof. Remember, one of the premises of deductive reasoning is that one bit of information leads to another bit of information and so on.

Transitive property: If a=b and b=c then a=c, commonly used in solving geometric problems.

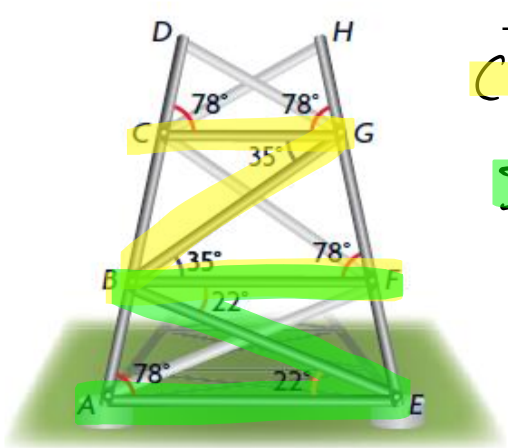
Example 1: When a transversal intersects a pair of parallel lines, prove the alternate interior angles are equal.

Sketch:



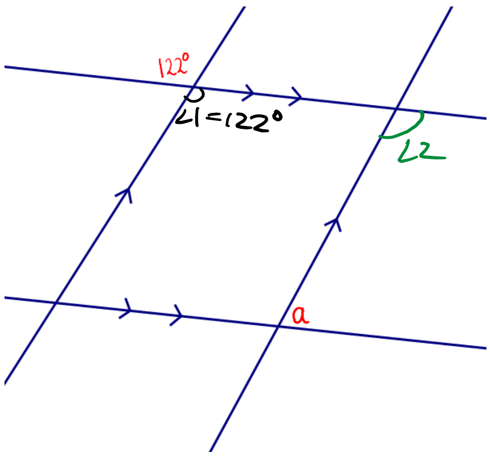
Statement	Justification
$\angle 1 = \angle 2$	vertically opposite
$\angle 1 = \angle 3$	corresponding $\angle$s
$\angle 2 = \angle 3$	transitive property
alternate interior $\angle$s are equal	same angle

Example 2: One side of a cellphone tower will be built as shown. Use the angle measures to prove that braces CG, BF, and AE are parallel.



Statement	Justification
CG ∥ BF	alternate interior angles
BF ∥ AE	alternate interior angles
CG ∥ AE	transitive property.

Example 3: Prove that ∠a = 58°.



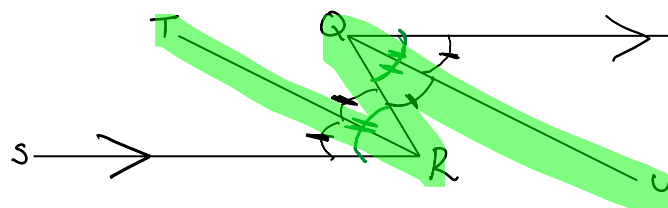
Statement	Justification
∠1 = 122°	vertically opposite
∠2 = 122°	alternate exterior corresponding ∠s
∠a = 58°	interior ∠s

Example 4: Given: $QP \parallel RS$

RT bisects $\angle QRS$

QU bisects PQR

Prove: $QU \parallel RT$



Statement	Justification
QP ∥ RS	Given
∠SRQ = ∠PQR	alt. interior ∠s
RT bisects ∠QRS	given
QU bisects ∠PQR	given
∠TRQ = ∠RQU	both bisected from equal angle
QU ∥ RT	alternate interior ∠s

P 79 8, 10, 14, 16, [redacted] 20, [redacted]