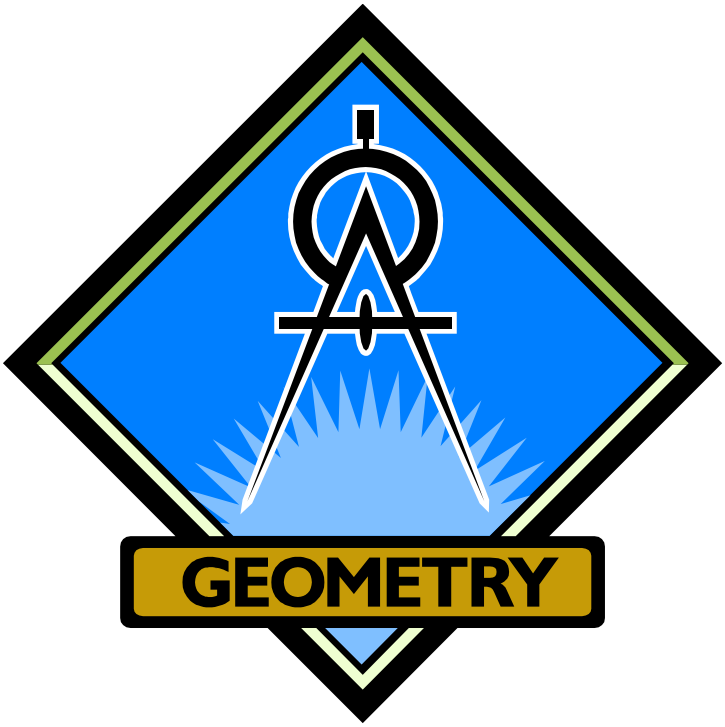
Name: _____

FORMAL GEOMETRY
2022-23



Chapter 1 PROOFS PACKET

What is a proof?

Proofs are logical arguments in which each statement you make is supported by a reason that is accepted as true. Reasons are usually properties, definitions, postulates, or theorems.

Why proofs?

Proofs are used to develop our deductive reasoning skills which enable us to come up with logical conclusions; these are essential skills in becoming great problem solvers. At the same time they help us gain a greater understanding as to why something is true.

Key Terms:

A **definition** states the meaning of a term or idea.

A **postulate** is an unproved assumption that is accepted as true.

A **theorem** is a mathematical statement that can be proved.

Types of Proofs:

Two-Colum Proofs: A formal proof that contains statements and reasons organized in two columns. Each step is called a statement, and the properties that justify each step are called reasons. **(These are the most common proofs you will encounter in this course.)**

Paragraph Proofs: An informal proof written in the form of a paragraph that explains why a conjecture for a given situation is true.

Theorem Procedure:

1. We present a theorem or theorems.
2. We prove the theorem(s).
3. We use the theorem to help prove sample problems.
4. You are given the challenge of using the theorems to prove homework problems. Theorems will save you much time if you learn them and then use them.

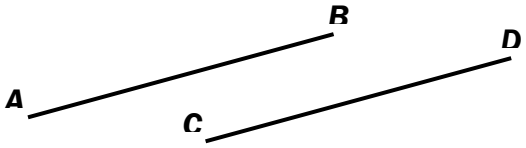
The Proof Process:

Step 1	***List the given information and, if possible draw a diagram to illustrate this information.***	****Usually given in the problem.***
Step 2	***State the theorem or conjecture to be proven.***	
Step 3	***Create a deductive argument by forming a logical chain of statements linking the given to what you are trying to prove.***	
Step 4	***Justify each statement with a reason. Reasons Include definitions, algebraic properties, postulates, and theorems.***	
Step 5	***State what it is that you have proven.***	

1-1

1) Given: $\overline{AB} \cong \overline{CD}$

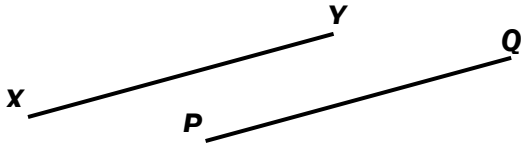
Prove: $AB = CD$



Statements	Reasons

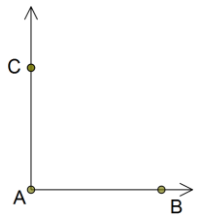
2) Given: $XY = PQ$

Prove: $\overline{XY} \cong \overline{PQ}$



Statements	Reasons

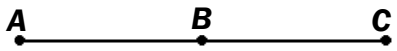
3) Given: $\angle CAB$ is a right angle.
Prove: $m\angle CAB = 90$



Statements	Reasons

4. Given: AB = BC

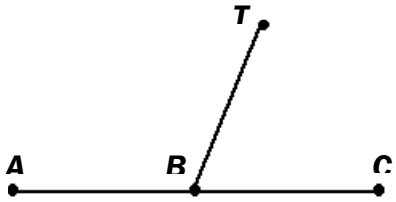
Prove: B is the midpoint of $\overline{AC}$



Statements	Reasons

5. Given: $\overline{AB} \cong \overline{BC}$

Prove: $\overline{TB}$ bisects $\overline{AC}$



Statements	Reasons

6. Given: $m\angle A + m\angle B = 180$

Prove: $\angle A$ supplementary to $\angle B$.

Statements	Reasons

1-4

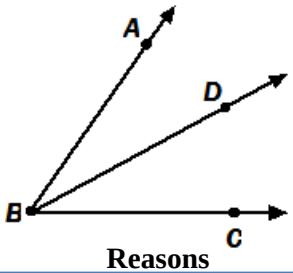
7. Given: $m\angle A = 76°$, $m\angle A = m\angle B$

Prove: $m\angle B = 76°$

Statements	Reasons

8. Given: $\overrightarrow{BD}$ bisects $\angle ABC$

Prove: $\angle ABD \cong \angle DBC$

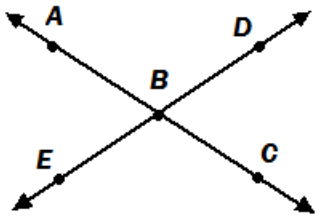


Statements	Reasons

1-5

9. Given: Diagram

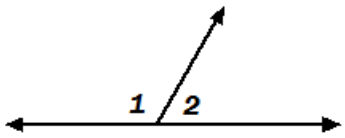
Prove: $\angle ABE \cong \angle DBC$



Statements	Reasons

10. Given: Diagram.

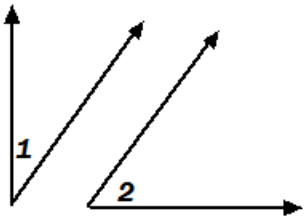
Prove: $\angle 1$ is supplementary to $\angle 2$



Statements	Reasons

11. Given: $m\angle 1 + m\angle 2 = 90$

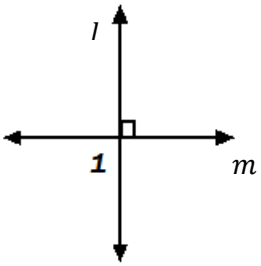
Prove: $\angle 1$ and $\angle 2$ are complementary.



Statements	Reasons

12. Given: $l \perp m$

Prove: $\angle 1$ is a right angle.



Statements	Reasons