Mathematical Proofs

Name:_____

Date: _____ Period:_____

Vocabulary:

Postulate:

A statement that is assumed to be true without a proof. It is considered to be a statement that is "obviously true". Postulates may be used to prove theorems true.

Theorem:

A statement that can be proven to be true based upon postulates and previously proven theorems.

Proof:

A proof is a written account of the complete thought process that is used to reach a conclusion. Each step of the process is supported by a theorem, postulate or definition verifying why the step is possible.

Types of Proofs:

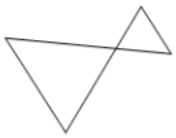
1. *** Two Column
2. Paragraph
3. Flow

Two Column Proof

Proofs in geometry always have:

Given : A

Prove : B



A diagram showing the given information

Statements	Reasons
1. A logical series of statements that lead from the given information to what is to be proved in an organized order.	Reasons must be given to justify each statement, just like a lawyer does in a criminal trial. He presents evidence and witnesses to back-up his statements or accusations.
	Results can be: Definitions, Postulates, Axioms, Theorems, Properties, Given facts — From Algebra or Geometry

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Algebraic Proofs

The following are the properties of equality and are used to solve algebraic proofs:

Properties of Equality

Let x, y and z represents Real Numbers

Reflexive	x = x
Symmetric	If x = y, then y = x
Transitive	If x = y and y = z, then x = z
Addition	If x = y, then x + z = y + z
Subtraction	If x = y, then x - z = y - z
multiplication	If x = y, then x × z = y × z
Division	If x = y, then x ÷ z = y ÷ z
Substitution	If x = y, then y can be substituted for x in any expression.

Example 1: Solve the following equation:

$$\frac{4x+6}{2} = 9$$

$\frac{2}{1}\left(\frac{4x+6}{2}\right) = \frac{2}{1}\cdot\frac{9}{1}$ Multiply

$4x + 6 = 18$ Simplify

$-6 \quad -6$ Subtraction

$4x = 12$ Simplify

$\frac{4x}{4} = \frac{12}{4}$ Divide

$x = 3$ Simplify

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Example 2:

Given: $\frac{4x+6}{2} = 9$

Prove: $x = 3$

Statements	Reasons
1) $\frac{4x+6}{2} = 9$	1) Given
2) $2(\frac{4x+6}{2}) = 9 \cdot 2$	2) Multiplication
3) $4x+6 = 18$	3) Simplify
4) $4x+6-6 = 18-6$	4) Subtraction
5) $4x = 12$	5) Simplify
6) $4x/4 = 12/4$	6) Division
7) $x = 3$	7) Simplify

Assignment:

1. Given: $4x + 8 = x + 2$

Prove: $x = -2$

Statements	Reasons

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2. Given: $\frac{3x+5}{2} = 7$

Prove: $x = 3$

Statements	Reasons

3. Given: $2x - 7 = \frac{1}{3}x - 2$

Prove: $x = 3$

Statements	Reasons

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