

2.5 Notes Algebraic Proofs: 😊

2 column proof

Flow Chart proofs

Paragraph proofs

Euclidean geometry is one of the first mathematical fields where results require proofs rather than calculations. Proof-writing is the standard way mathematicians communicate what results are true and why. The entire field is built from Euclid's postulates.

*A proof is an argument that uses postulates, theorems, definitions, and previously proven statements to show that a conjecture (statement) is true.

*A TWO-column proof has statements in the left column and reasons in the right column. Each reason is the explanation for the corresponding statement. (justifications)

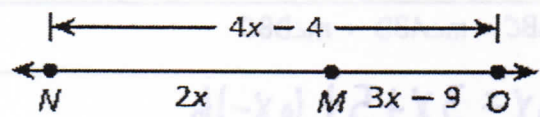
An important part of writing a proof is giving justifications to show that every step is valid.

Example 1: Given: $5x - 3 = 4(x + 2)$
 Prove: $x = 11$

Statements	Reasons
$5x - 3 = 4(x + 2)$	Given
$5x - 3 = 4x + 8$	Distributive POE
$x - 3 = 8$	Subtraction POE
$x = 11$	Addition POE

DIAGRAM IS PART OF MY GIVEN

Example 2: Given: $NM = 2x$, $MO = 3x - 9$, $NO = 4x - 4$
 Prove: $x = 5$



Statements	Reasons
$NM = 2x$, $MO = 3x - 9$, $NO = 4x - 4$	Given
$NM + MO = NO$	Segment Addition Postulate
$2x + 3x - 9 = 4x - 4$	Substitution POE
$5x - 9 = 4x - 4$	C.L.T.
$x - 9 = -4$	Subtraction POE
$x = 5$	Addition POE

Example 3: **Given:** T is the midpoint SU
 Prove: $x = 5$

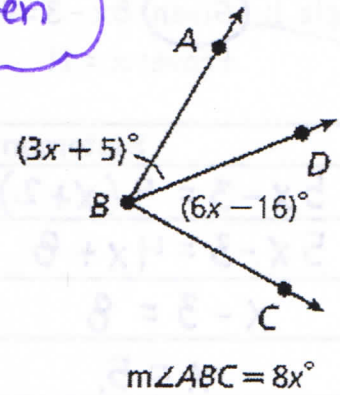


Statements	Reasons
T is the midpoint SU	Given
$\overline{ST} \cong \overline{TU}$	Def of midpoint
$ST = TU$	Def of congruence
$7x = 3x + 20$	Substitution POE
$4x = 20$	Subtraction POE
$x = 5$	Division POE

Figure is also part of my given

Example 4: Write a justification for each step.

Given: $m\angle ABD = (3x + 5)$, $m\angle DBC = (6x - 16)$, $m\angle ABC = (8x)$
 Prove: $x = 11$



Statements	Reasons
$m\angle ABD = (3x + 5)$, $m\angle DBC = (6x - 16)$, $m\angle ABC = (8x)$	Given
$m\angle ABC = m\angle ABD + m\angle DBC$	Angle Addition Post
$8x = 3x + 5 + 6x - 16$	Substitution POE
$8x = 9x - 11$	C.L.T.
$-x = -11$	Subtraction POE
$x = 11$	Division POE