

Name _____

Date _____

Period 5

More Proofs

Lesson Objective

WBAT write flow chart proofs and two-column proofs.

Theorem: A theorem is a statement that can be proven.

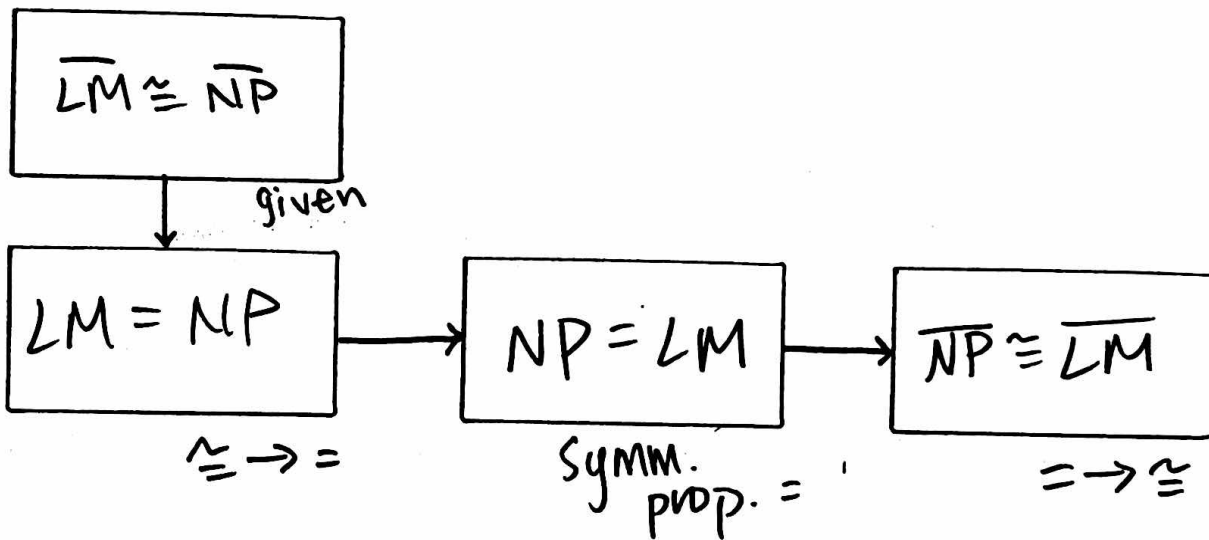
→ Once you have proven a theorem, you can use it as a reason in other proofs.

Flow Chart Proofs

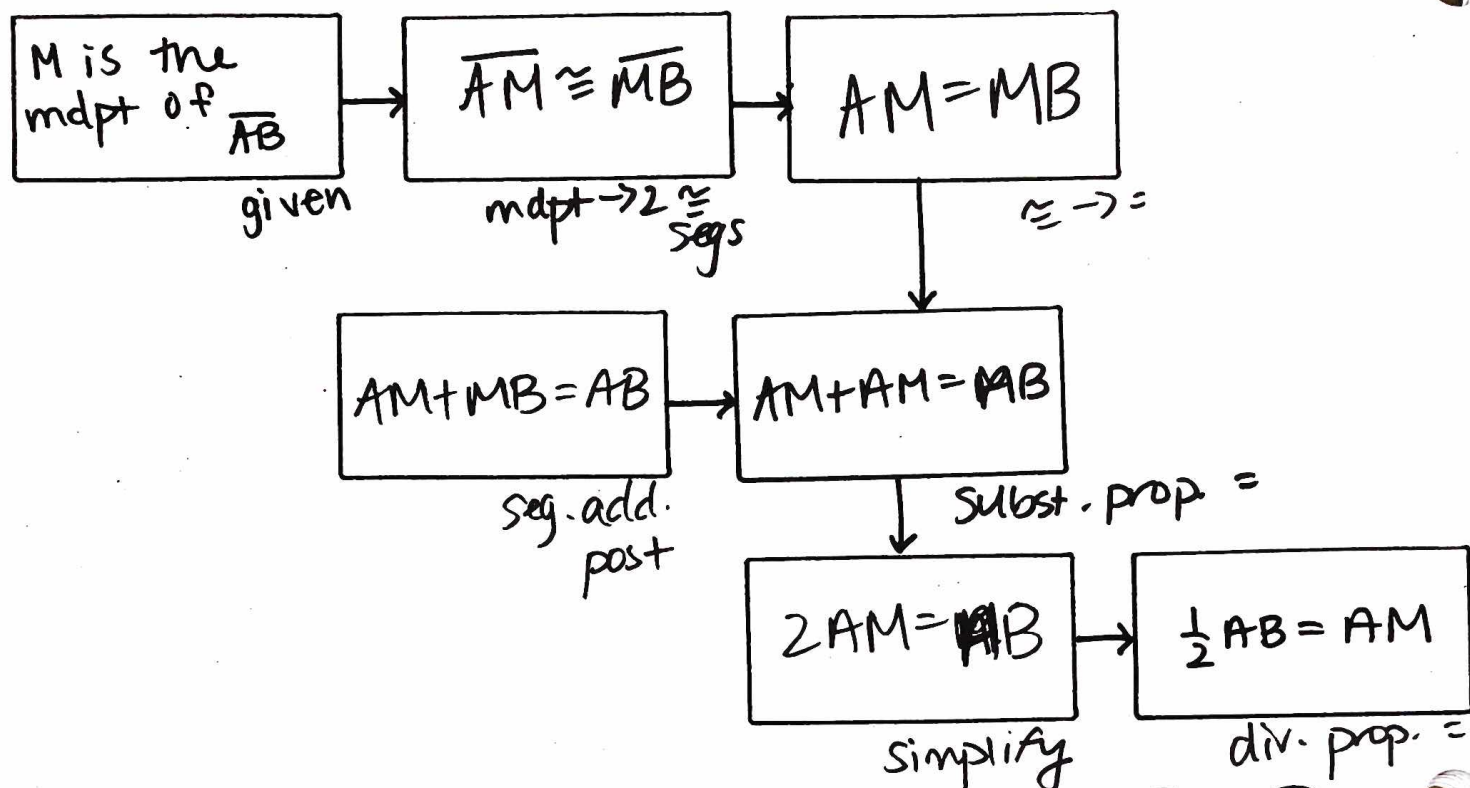
A flow chart proof uses boxes and arrows to show the flow of a logical argument. Each reason is below the statement it justifies.

Examples:

1. Prove the Symmetric Property of Congruence.

Given $\overline{LM} \cong \overline{NP}$ Prove $\overline{NP} \cong \overline{LM}$ 

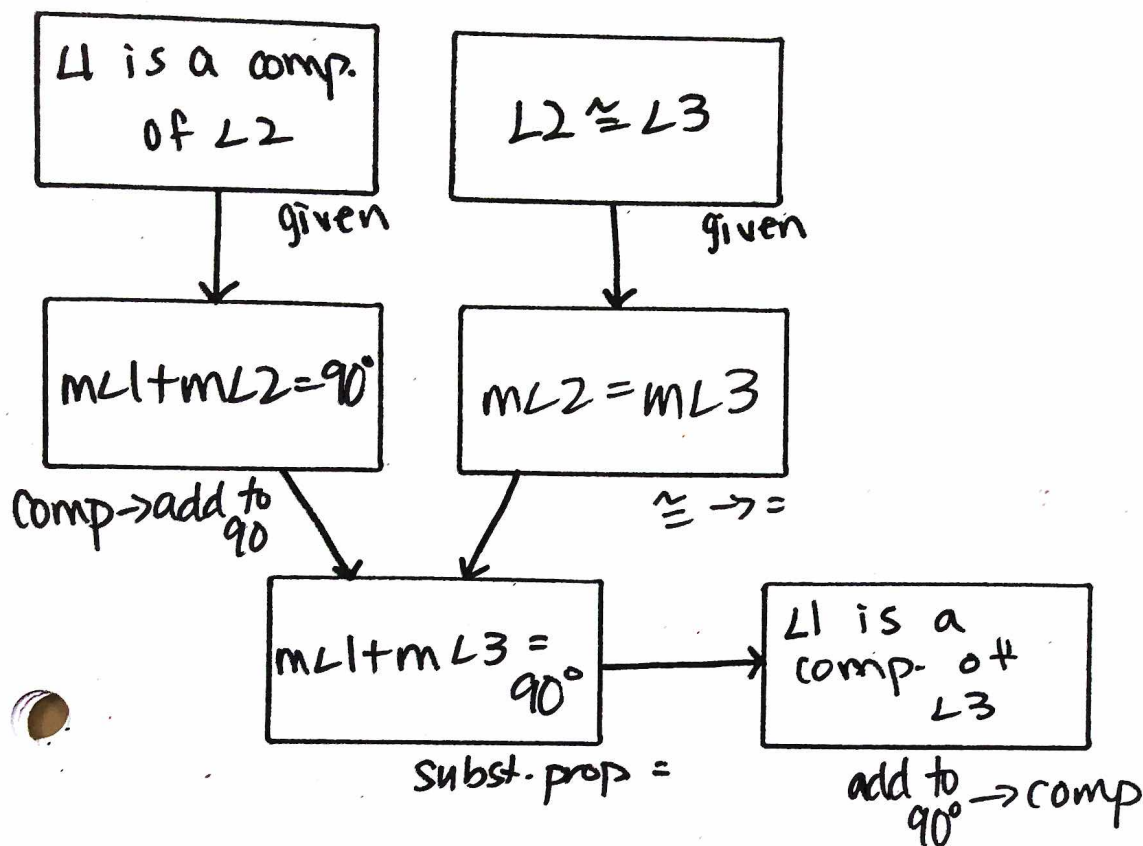
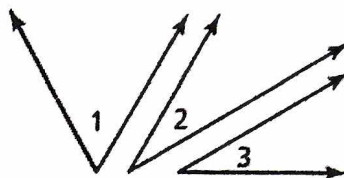
2. Prove this property of midpoints: If you know that M is the midpoint of $\overline{AB}$, prove that AM is one-half the length of AB.



Statements	Reasons
① M is mdpt of $\overline{AB}$	① given
② $\overline{AM} \cong \overline{MB}$	② mdpt $\rightarrow 2 \cong$ segs.
③ $AM = MB$	③ $\cong \rightarrow =$
④ $AM + MB = AB$	④ seg. add. post
⑤ $AM + AM = AB$	⑤ subst. prop. =
⑥ $2AM = AB$	⑥ simplify
⑦ $AM = \frac{1}{2}AB$	⑦ div. prop. =

3. Given $\angle 1$ is a complement of $\angle 2$,
 $\angle 2 \cong \angle 3$

Prove $\angle 1$ is a complement of $\angle 3$.



Statements

Reasons

① $\angle 1$ comp $\angle 2$
 $\angle 2 \cong \angle 3$

① given

② $m\angle 1 + m\angle 2 = 90^\circ$

② comp $\rightarrow$ add to 90°

③ $m\angle 2 = m\angle 3$

③ $\cong \rightarrow =$

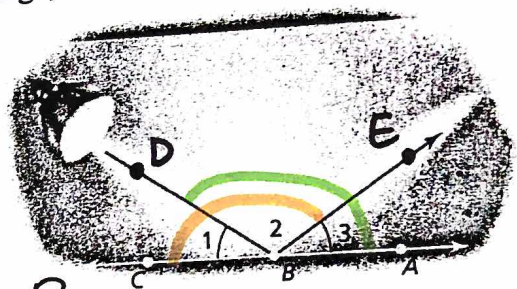
④ $m\angle 1 + m\angle 3 = 90^\circ$

④ subst. prop. =

⑤ $\angle 1$ comp $\angle 3$

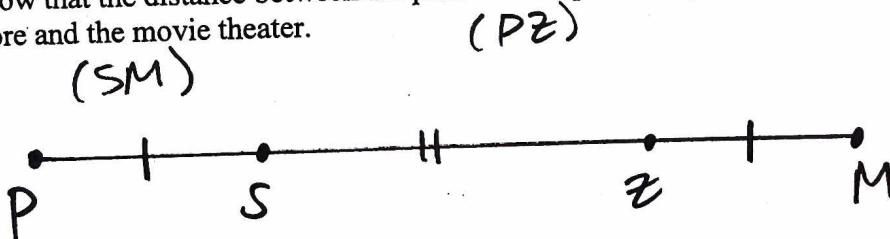
⑤ add to $90^\circ \rightarrow$ comp.

2. You reflect the beam of a spotlight off a mirror lying flat on a stage, as shown. Determine whether $m\angle DBA = m\angle EBC$.



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|---|--|
| <p style="text-align: center; font-size: 2em;">S</p> <ol style="list-style-type: none"> ① $\angle CBD \cong \angle ABE$ ② $m\angle CBD = m\angle ABE$ ③ $m\angle CBD + m\angle DBE =$
$m\angle ABE + m\angle DBE$ ④ $m\angle CBD + m\angle DBE = m\angle EBC$
$m\angle ABE + m\angle DBE = m\angle DBA$ ⑤ $m\angle EBC = m\angle DBA$ | <p style="text-align: center; font-size: 2em;">R</p> <ol style="list-style-type: none"> ① given (diagram: arcs) ② $\cong \rightarrow =$ ③ add. prop. = ④ Angle Add. post. ⑤ <u>subst prop.</u> = |
|---|--|

3. A park, a shoe store, a pizza shop, and a movie theater are located in order on a city street. The distance between the park and the shoe store is the same distance between the pizza shop and the movie theater. Show that the distance between the park and the pizza shop is the same as the distance between the shoe store and the movie theater.



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| <p style="text-align: center; font-size: 2em;">S</p> <ol style="list-style-type: none"> ① $PS = ZM$ ② $PS + SZ = ZM + SZ$ ③ $PZ = PS + SZ$
$SM = SZ + ZM$ ④ $PZ = SM$ | <p style="text-align: center; font-size: 2em;">R</p> <ol style="list-style-type: none"> ① <u>given</u> ② add. prop. = ③ seg. add. post. ④ subst. prop. = |
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