S-G Geometry Session 5 6/22

hypothesis
If you are watching the Minims Movie, then you should punch yourself in your stupid, stupid face
conclusion

Converse: If you punch yourself in your stupid, stupid face, then you are watching the Minims Movie.
false counterexample: you could be Nate

hypothesis
If it is August 24th 2023, then all of your assignments are due today. conclusion

switch order
Converse: If all of your assignments are due today, then it is August 24th 2023.

Biconditional statement — true — "if, and only if"

All of your assignments are due today if, and only if, it is August 24th 2023.

A: If you are still playing fortnite, then you're living a sad, lonely life. B

B: If you're living a sad, lonely life, then you might as well get some Krispy Kreme donuts because you are already a failure.

Law of Syllogism (Transitive Property)

$A \rightarrow \cancel{B}$ $\cancel{B} \rightarrow C$ $\quad A \rightarrow C$

A: If you are still playing fortnite, then you might as well get some Krispy Kreme donuts because you are already a failure. C

If you owe money to hobos, then you live in constant fear of hobo attack.

hypothesis

conclusion

- Nick owes money to hobos.

  Nick lives in constant fear of hobo attack

- Emma lives in constant fear of hobo attack

  No conclusion

Introductim to Proofs

Given: $3x + 12 = 8x - 18$

Prove: $x = 6$

Statements	Reasons
$3x + 12 = 8x - 18$	Given
$-12 \quad -12$	
$3x = 8x - 30$	Subtractim Property of Equality (SPE)
$-8x \quad -8x$	
$-5x = -30$	Subtractim Property of Equality (SPE)
$\frac{-5x}{-5} = \frac{-30}{-5}$	
$x = 6$	Divisim Property of Equality

Given: $3k + 5 = 17$

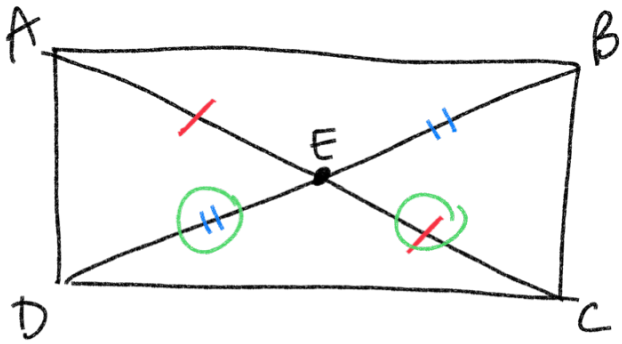
Prove: $k = 4$

Statement	Reasm
$3k + 5 = 17$	Given
$-5 \quad -5$	
$3k = 12$	Subtractim Prop of Eq (SPE)
$\frac{3k}{3} = \frac{12}{3}$	
$k = 4$	Divisim Prop of Eq. (DPE)

Given: $3(5x+1) = 13x+5$

Prove: $x = 1$

Statement	Reasons
$3(5x+1) = 13x+5$	Given
$15x + 3 = 13x + 5$	Distributive Property (Simplify)
$-13x \quad -13x$	Subtract P.o.E
$2x + 3 = 5$	
$-3 \quad -3$	Subtract P.o.E
$\frac{2x}{2} = \frac{2}{2}$	
$x = 1$	Division P.o.E



Given: E is the midpoint of $\overline{AC}$ and $\overline{BD}$

Prove: $\overline{AE} \cong \overline{BE}$

$\overline{ED} \cong \overline{EC}$

① $\overline{AE} = \overline{EC}$

③ $\overline{EC} = \overline{ED}$

② $\overline{ED} = \overline{EB}$

Statement	Reasons
E is midpoint of $\overline{AC}$ and $\overline{BD}$	Given
① $\overline{AE} \cong \overline{EC}$	} Definition of a midpoint
③ $\overline{DE} \cong \overline{EB}$	
② $\overline{ED} \cong \overline{EC}$	Given
$\overline{AE} \cong \overline{BE}$	Law of Syllogism or Transitive Property

$\overline{AE} = \overline{EC} = \overline{ED} = \overline{EB}$

Given: $\overline{AB} = 2x+3$

$\overline{BC} = x$

$\overline{AC} = 24$

Prove $x = 7$

Statements	Reasons
$\overline{AB} = 2x+3$	Given
$\overline{BC} = x$	Given
$\overline{AC} = 24$	Given
$\overline{AB} + \overline{BC} = \overline{AC}$	Segment Addition Postulate (SAP)
$2x+3 + x = 24$	substitution
$3x+3 = 24$	simplify "combine like terms"
$-3 \quad -3$	subtraction PoE
$\frac{3x}{3} = \frac{21}{3}$	Division PoE
$x = 7$	