Reasoning & Proof Review Chapter 2

Rewrite the given statement into if-then form. Then tell what the converse, inverse, contrapositive is.

1. All octagons have 8 sides.

a. If-Then Conditional statement: If a polygon is an octagon, then it has 8 sides

b. Hypothesis: a polygon is an octagon

c. Conclusion: it has 8 sides

d. Converse: If a polygon has 8 sides, then it is an octagon

e. Inverse: If a polygon is not an octagon, then it does not have 8 sides

f. Contrapositive: If a polygon doesn't have 8 sides, then it is not an octagon

Determine the truth-value for the following statements. If a statement if false, give a counter example.

2. If you are a freshman, then you have Mr. Sullivan for math. False, Chloe has Mr. McConnell for Math

3. If a number is divisible by 10, then it ends with a "0". True

4. If your first name is Barb, then your last name is Dwyer. False Barb B. Doll

5. If the figure is a triangle, then its angles are all acute. False, 

Find a pattern for each sequence. Use the pattern to find the next two terms.

6. 30, 23, 16, 9... 2, -5 (−7, −7, −7)

7. 1, 0, 10, 0, 100, ... 0, 1000

8. 64, 32, 16... 8, 4 (·½, ·½)

Support each conclusion with a valid reason.

11. Given: $5x = 25$

Conclusion: $x = 5$

Reason: Div'n prop of =

12. Given: $3(2y + x) = -12$

Conclusion: $6y + 3x = -12$

Reason: Distr. prop of =

13. Given: $-x = 21$

Conclusion: $x = -21$

Reason: Div'n prop of =

14.

Given: $24 - 2(x - 2) - 30 = 0$ Prove: $x = -1$

#14 (Proof)

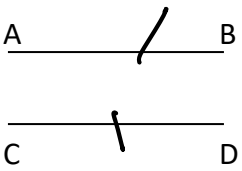
Statement	Reason
1. $24 - 2(x - 2) - 30 = 0$	1. Given
2. $24 - 2x + 4 - 30 = 0$	2. Dist. prop of =
3. $-2x - 2 = 0$	3. Subst. prop of =
4. $-2x = 2$	4. Add'n prop of =
5. $x = -1$	5. Div'n prop of =
6.	6.

15. Prove the Midpoint Theorem.

Given: M is the midpoint of $\overline{MB}$ Prove: $\overline{AM} \cong \overline{MB}$

Statement	Reason
#1) M is the MIDPOINT of $\overline{AB}$	#1) GIVEN
#2) $AM = MB$	#2) Def'n of MIDPOINT
#3) $\overline{AM} \cong \overline{MB}$	#3) Def'n of $\cong$ Segs

16. Prove Theorem 2-1: Congruence of segments is symmetric



Given $\overline{AB} \cong \overline{CD}$
Prove $\overline{CD} \cong \overline{AB}$

Statement	Reason
a) $\overline{AB} \cong \overline{CD}$	a) Given
b) $AB = CD$	b) Def'n of Congruent Segments
c) $CD = AB$	c) Symmetric PoE for $\mathbb{R}$
d) $\overline{CD} \cong \overline{AB}$	d) Def'n of Congruent Segments

17. Prove Theorem 2-5: Congruence of angles is transitive.

Given $\angle 1 \cong \angle 2$
$\angle 2 \cong \angle 3$

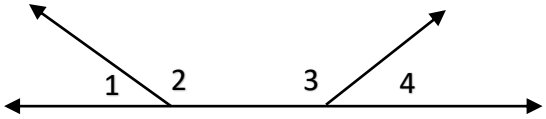
Prove $\angle 1 \cong \angle 3$

Statement	Reason
a) $\angle 1 \cong \angle 2$ $\angle 2 \cong \angle 3$	a) Given
b) $m\angle 1 = m\angle 2$ $m\angle 2 = m\angle 3$	b) Def'n of congruent angles
c) $m\angle 1 = m\angle 3$	c) Transitive PoE for $\mathbb{R}$
d) $\angle 1 \cong \angle 3$	d) Def'n of congruent angles

18. Prove theorem 2-6 – Angles supplementary to congruent angles are congruent.

Given $\angle 1$ and $\angle 2$ are supplementary
$\angle 3$ and $\angle 4$ are supplementary
$\angle 1 \cong \angle 4$

Prove $\angle 2 \cong \angle 3$

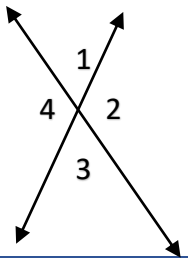


Statement	Reason
a) $\angle 1$ and $\angle 2$ are supple. $\angle 3$ and $\angle 4$ are supple $\angle 1 \cong \angle 4$	a) Given
b) $m\angle 1 + m\angle 2 = 180^\circ$ $m\angle 3 + m\angle 4 = 180^\circ$	b) Definition of supplementary
c) $m\angle 1 = m\angle 4$	c) Def'n of congruent angles
d) $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	d) Substitution PoE for $\cancel{R}$
e) $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 1$	e) Substitution PoE for $\cancel{R}$
f) $m\angle 2 = m\angle 3$	f) Subtraction PoE for $\cancel{R}$
g) $m\angle 2 \cong m\angle 3$	g) Def'n of congruent angles

19. Prove Vertical Angles Theorem:

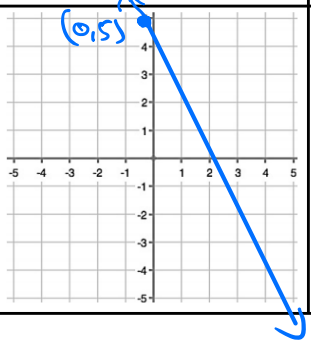
Given ∠1 and ∠2 form a linear pair
∠2 and ∠3 form a linear pair

Prove ∠1 ≅ ∠3



Statement	Reason
#1) ∠1 and ∠2 are linear pair ∠2 and ∠3 are linear pair	#1) GIVEN
#2) ∠1 and ∠2 are Supplementary ∠2 and ∠3 are Supplementary	#2) Supplement Th'm
#3) ∠1 ≅ ∠3	#3) Two angles supplementary to the same angle are congruent

Algebra Review

Solve each equation for x!		Multiply!	Factor!
1. $12x - 6 = -3$ $12x = 3$ $x = \frac{3}{12}$ $x = \frac{1}{4}$	2. $5x - 4 = 3x - 4$ $2x - 4 = -4$ $2x = 0$ $x = 0$	3. $5x(3x - 2)$ $= 15x^2 - 10x$	4. $10x^2 - 20x$ $= 10x(x - 2)$
5. Graph the equation: $y = 5 - 2x$ 		6. Graph the equation: $y = 5$ 