IV. Given: $\angle 2 \cong \angle 3$

Prove: $\angle 1 \cong \angle 4$

___

1. $\angle 1 \cong \angle 2$ 1.

2. $\angle 2 \cong \angle 3$ 2.

3. $\angle 3 \cong \angle 4$ 3.

4. $\angle 1 \cong \angle 4$ 4.
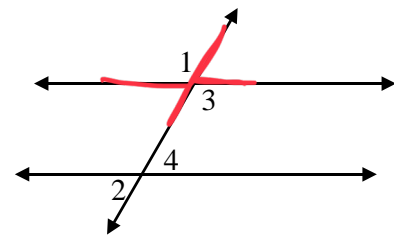
V. Given: $\angle 1$ and $\angle 2$ are complementary

Prove: $\overrightarrow{XA} \perp \overrightarrow{XC}$

___
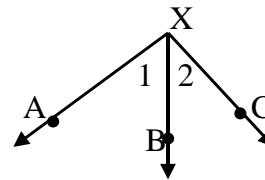
1. $\angle 1$ and $\angle 2$ are complementary | 1.

2. $m\angle 1 + m\angle 2 = $ _____ | 2.

3. $m\angle AXC = m\angle 1 + m\angle 2$ | 3.

4. $m\angle AXC = $ _____ | 4.

5. $\angle AXC$ is a right angle | 5.

6. | 6.

VI. Given: $\angle 1$ and $\angle 2$ are supplementary

Prove: $\angle 3$ and $\angle 4$ are supplementary

___

1. $\angle 1$ and $\angle 2$ are supplementary   1. Given

2. $\angle 1 + \angle 2 = 180°$ 2. Def. of supplementary angles

3. $\angle 1 \cong \angle 3$; $\angle 2 \cong \angle 4$ 3. Vertical angles are congruent

4. $\angle 1 = \angle 3$; $\angle 2 = \angle 4$ 4. Def. of congruent angles

5. $\angle 3 + \angle 4 = 180°$ 5. Substitution "Replacement"

6. $\angle 3$ and $\angle 4$ are supplementary   6. Def. of _supplementary_

VII. Given: $\overrightarrow{BD}$ bisects <EBC

Prove: <1 and <3 are supplementary
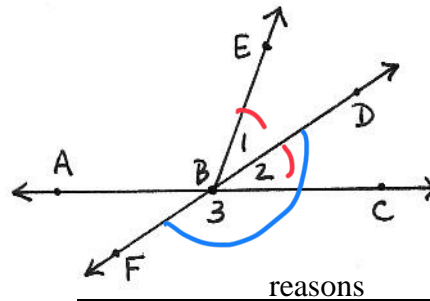
statements	reasons

1. $\overrightarrow{BD}$ bisects <EBC — 1. Given

2. <1 ≅ <2 — 2. Definition of bisector

3. <2 and <3 form a linear pair — 3. Definition of linear pair

4. m<2 + m<3 = 180 — 4. Definition of linear pair

5. m<1 = m<2 — 5. Definition of congruency

6. m<1 + m<3 = 180 — 6. Substitution

7. <1 and <3 are supplementary — 7. Def of supplementary

VIII. Given: <FEC is a right angle

Prove: <1 and <4 are complementary
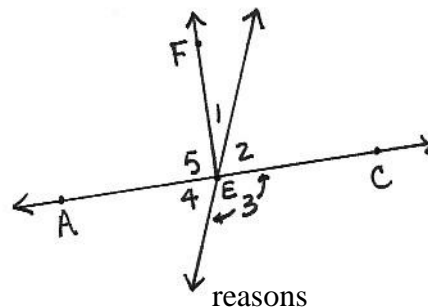
statements	reasons

1. <FEC is a right angle — 1.

2. m<FEC = 90 — 2.

3. m<FEC = m<1 + m<2 — 3.

4. m<1 + m<2 = 90 — 4.

5. <2 ≅ <4 — 5.

6. m<2 = m<4 — 6.

7. m<1 + m<4 = 90 — 7.

8. <1 and <4 are complementary — 8

Geometry Chapter 2 Pre-Test

1.) (16 pts total, 4 pts each) (2.1 Conditional Statements) For each statement, identify both the conclusion and hypothesis, provide the converse, and assess the validity of the converse statement.

a) If yogurt is green and smells weird, then you probably should not eat it.

hyp   conc

Converse: If you should not eat it, then it is yogurt that is green and smells weird.

False

b) If you pee in the bathtub, then you have done something very wrong.

hyp   conc.

Converse: If you have done something very wrong, then you have peed in the bathtub.

False

c) If you are eating a delicious burrito, then you are eating Mexican food.

d) If $x = 5$, then $x^2 = 25$

hyp   conc

Conv: If $x^2 = 25$, then $x = 5$

false   counterexample $x = -5$

2.) (16 pts total, 4 pts each) (2.2 Biconditionals and Definitions) Each conditional statement is true. Write and consider the converse. If the converse is true, combine the statements and write them as a biconditional.

a) If you are a fan of the Boston Red Sox, then you are a fan of the 2018 World Series Champions.

b) If you are friends with Nate, then you are accustomed to disappointment.

hyp   conc

Conv: If you are accustomed to disappointment, then you are friends with Nate.

false

c) If you are ~~Jeff Bezos~~ Elon Musk, then you are the richest ~~man~~ thing in the world.

hyp   conc.

Conv: If you are the richest thing in the world, then you are Musk.

d) If you own a raccoon, then you have made a poor decision.

True! Biconditional statement:
You are the richest thing in the world
if, and only if, you are Musk.

3.) (8 pts total, 4 pts each) (2.3 Deductive Reasoning) Use the law of detachment to draw a conclusion. If not possible, write not possible.

a) If you are a fan of Macklemore, then you have poor taste in music. *hyp*

Nate has poor taste in music.

No conclusion

b) If you say you're going to bring donuts and don't bring donuts, then Hannah is going to knock you out. *hyp* *Nomi*

Nate said he was going to bring donuts and didn't.

Nomi throws fists @ Nate.

4.) (8 pts total, 4 pts each) (2.3 Deductive Reasoning) Use the law of syllogism to draw conclusions from the following statements.

a) If Nate loses his hair, then he will be sad and depressed. If Nate is sad and depressed, then he will buy a Cold Stone Creamery franchise and eat ice cream all day every day.

Nate found two hairs on his desk.

Nate will buy CSC and eat freely.

b) If you do well in school, then you will go to college. If you go to college, then you will be more likely to have a successful, fulfilling professional career.

Charlie is doing well in school.

5.) (16 pts total, 8 pts each) (2.4 Reasoning in Algebra) Complete the following proofs.
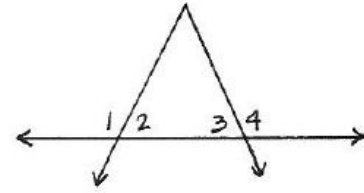
a) Given: 8x + 3 = 43
   Prove: x = 5

Statement	Reasoning
1.) 8x + 3 = 43 -3 -3	1.) Given
2.) 8x = 40	2.) Sub PoE
3.) x = 5	3.) Div PoE

b) Given: 3(2a - 5) = 45
   Prove: a = 10

Statement	Reasoning
1.) 3(2a - 5) = 45	1.) Given
2.) 6a - 15 = 45 +15 +15	2.) Simplify or Distribution
3.) 6a = 60	3.) Add PoE
4.) a = 10	4.) Div PoE

b)

IX. Given: $\angle 2 \cong \angle 3$

Prove: $\angle 1 \cong \angle 4$

statements	reasons
1. $\angle 1$ and $\angle 2$ form a linear pair $\angle 3$ and $\angle 4$ form a linear pair	1. Def of linear pair
2. $\angle 1$ and $\angle 2$ are supp. $\angle 4$ and $\angle 3$ are supp.	2. Def of supplemental
3. $\angle 2 \cong \angle 3$ $\qquad \angle 1 + \angle 2 = 180$	3. Given
4. $\angle 1 \cong \angle 4$ $\qquad \angle 3 + \angle 4 = 180$	4. Substitution

$$\angle 1 + \angle 2 = \angle 3 + \angle 4$$
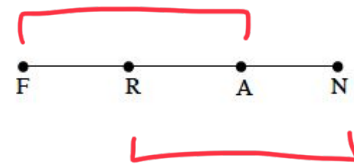$$\downarrow$$
$$\angle 1 + \angle 3 = \angle 3 + \angle 4$$
$$\angle 1 = \angle 4$$

c)

Given: $\overline{FR} \cong \overline{AN}$

Prove: $\overline{FA} \cong \overline{RN}$

Statement	Reason
$\overline{FR} \cong \overline{AN}$	Given
$\overline{FR} + \overline{RA} = \overline{FA}$	Segment Add Post. SAP
$\overline{RA} + \overline{AN} = \overline{RN}$	Substitution
$\overline{AN} + \overline{RA} = \overline{FA}$	Substitution or Syllogism
$\overline{FA} \cong \overline{RN}$	