Key

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.

hypothesis conclusion

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

False: There are other reasons you shouldn't eat yogurt— like it is teeming with bacteria. Just sayin!

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

hypothesis conclusion

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

False: though... I really want to say true.

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

hypothesis conclusion

Converse: If you are eating Mexican food, then ~~are~~ you are eating a delicious burrito.

False - maybe it isn't delicious. Maybe there are other Mexican foods other than burritos. Sounds unlikely. So the first one. Wait... tacos!

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

hypothesis conclusion

Converse:

If $x^2 = 25$, then $x = 5$.

False, $x = -5$ as well.

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.

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

True!

You are a fan of the Boston Red Sox if and only if you are a fan of the 2018 World Series Champions.

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

Converse: If you are accustomed to disappointment, then you are friends with Parker.

False ∴ I think.

Theoretically, there are other ways to become accustomed to disappointment — though I am unfamiliar with them.

c) If you are Jeff Bezos, then you are the richest man in the world.

Converse: If you are the richest man in the world, then you are Jeff Bezos.

True!

You are ~~the~~ Jeff Bezos if and only if you are the richest man in the world.

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

Converse: If you have made a poor decision, then you own a raccoon.

False.

You ~~can~~ could own stock in moviepass.

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.

Justin has poor taste in music.

not possible. If the conclusion is given, you cannot return the hypothesis.

Although... come on... Justin probably likes Macklemore.

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

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

Taylor is going to knock Cooper out.
If given the hypothesis — you can return the conclusion.

RIP Cooper...

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 is buying a Cold Stone Creamery franchise and is going to eat ice cream all day every day.

Because — what is there to live for. Bring on the rocky road!

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.

Sam is doing well in school.

Sam is more likely to have a successful, fulfilling professional career.

Thanks for rubbing it in, Sam...

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.) $8x + 3 = 43$	1.) given
2.) $8x = 40$	2.) Subtraction Property of Equality (Subt POE)
3.) $x = 5$	3.) Division Property of Equality (Div POE)

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

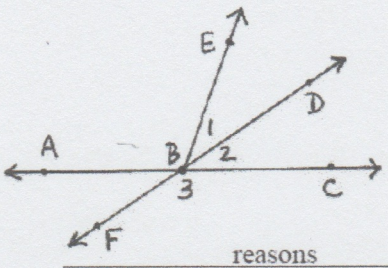
Statement	Reasoning
1.) $3(2a - 5) = 45$	1.) Given
2.) $6a - 15 = 45$	2.) Distributive Property of Equality (Dis POE)
3.) $6a = 60$	3.) Addition Property of Equality (Add POE)
4.) $a = 10$	4.) Div POE

6.) (36 pts total, 9 pts each) (2.5 Proving Angles Congruent) Complete the following proofs.

a)

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

Prove: <1 and <3 are supplementary

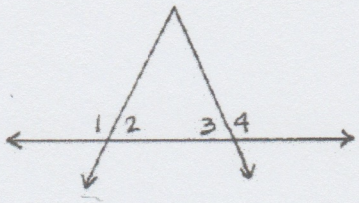


statements	reasons
1. $\overrightarrow{BD}$ bisects <EBC	1. given
2. <1 ≅ <2	2. Definition of bisector
3. <2 and <3 form a linear pair	3. Given / Definition of line
4. m<2 + m<3 = 180	4. Definition of linear pair
5. m<1 = m<2	5. Definition of congruency
6. m<1 + m<3 = 180	6. substitution
7. <1 and <3 are supplementary	7. Definition of supplementary angles.

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. Given / Definition of line
2. $\angle 1$ and $\angle 2$ are supp. $\angle 4$ and $\angle 3$ are supp.	2. Definition of supplemental angles (linear pair)
3. $\angle 2 \cong \angle 3$	3. given
4. $\angle 1 \cong \angle 4$	4. substitution

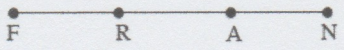
$m\angle 1 + m\angle 2 = 180°$
$m\angle 3 + m\angle 4 = 180°$

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

– all of this is implied in step 4 ∴

c)

Given: $\overline{FR} \cong \overline{AN}$
Prove: $\overline{FA} \cong \overline{RN}$



Statement	Reason
$\overline{FR} \cong \overline{AN}$	given
$\overline{FR} + \overline{RA} \cong \overline{FA}$	Segment Addition Postulate
$\overline{RA} + \overline{AN} \cong \overline{RN}$	Segment Addition Postulate
$\overline{RA} \cong \overline{FA} - \overline{FR}$	Subtraction
$\overline{RA} \cong \overline{RN} - \overline{AN}$	Subtraction
$\overline{FA} - \overline{FR} \cong \overline{RN} - \overline{AN}$	Substitution
$\overline{FA} - \overline{AN} \cong \overline{RN} - \overline{AN}$	Substitution
$\overline{FA} \cong \overline{RN}$	Addition

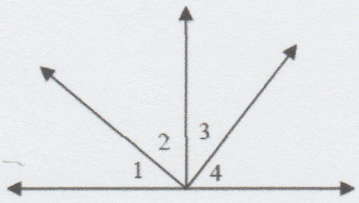
from here, many possibilities. here's one

(you could probably just say "substitution" in one line and be done ☺)

d)

Given: $\angle 1$ **and** $\angle 2$ **are complementary.**
$\angle 1 \cong \angle 3$
$\angle 2 \cong \angle 4$

Prove: $\angle 3$ **and** $\angle 4$ **are complementary.**



Statement	Reason
$\angle 1$ and $\angle 2$ are complementary	given
$\angle 1 + \angle 2 = 90^\circ$	Definition of complementary angles
$\angle 1 \cong \angle 3$	Given
$\angle 2 \cong \angle 4$	Given
$\angle 3 + \angle 4 = 90^\circ$	Substitution
$\angle 3$ and $\angle 4$ are complementary	Definition of complementary.