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*

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

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 $x^2 = 25$

Converse: If $x^2 = 25$, then $x = 5$
false $x = -5$

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.

If you are a fan of the 2018 WS Champs, then you are a fan of the Red Sox. True!

Biconditional: You are a fan of the Red Sox if, and only if, you are a fan of the 2018 WS Champs

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

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

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

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

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.

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.

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

Nate got knocked out!

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.

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	1.)
2.) 8x = 40	2.)
3.) x = 5	3.)

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

Statement	Reasoning
1.) 3(2a - 5) = 45	1.) Given
2.) 6a - 15 = 45	2.) Simplify or distribute
3.) 6a = 60	3.) 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: $\overline{BD}$ bisects <EBC

Prove: <1 and <3 are supplementary
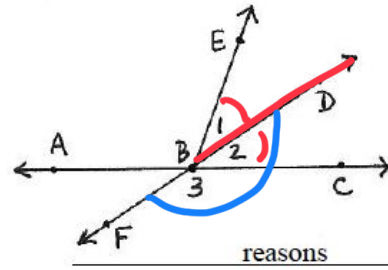
statements	reasons
1. $\overline{BD}$ bisects <EBC	1. Given
2. <1 ≅ <2	2. Definition of bisector
3. <2 and <3 form a linear pair	3. Definition of linear pair
4. m<2 + m<3 = 180	4. Definition of linear pair
5. m<1 = m<2	5. Definition of congruency
6. m<1 + m<3 = 180	6. substitution or syllogism
7. <1 and <3 are supplementary	7. Definition of supplementary.

≅ → =

Complementary → 90°
Supplementary → 180°

b)

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

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

$\angle 1 + \angle 2 = \boxed{180°}$

$\angle 3 + \angle 4 = 180°$
↓
$\angle 2 + \angle 4 = \boxed{180°}$

statements	reasons
1. $\angle 1$ and $\angle 2$ form a linear pair $\angle 3$ and $\angle 4$ form a linear pair	1. Definition of linear pair
2. $\angle 1$ and $\angle 2$ are supp. $\angle 4$ and $\angle 3$ are supp.	2. Definition of supplemental
3. $\angle 2 \cong \angle 3$	3. Given
4. $\angle 1 \cong \angle 4$) Big Jump!?!	4. Substitution or Syllogism
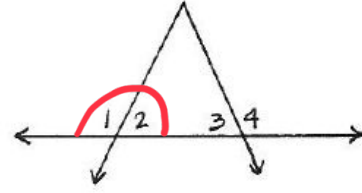
$\angle 1 + \angle 2 = \angle 2 + \angle 4$
$-\angle 2 \quad -\angle 2$

$\angle 1 = \angle 4$

c)

Given: $\overline{FR} \cong \overline{AN}$
Prove: $\overline{FA} \cong \overline{RN}$
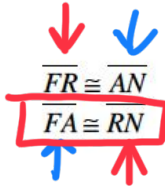
Statement	Reason
→ $\overline{FR} \cong \overline{AN}$	Given
$\overline{FR} + \overline{RN} = \overline{FN}$	} Segment Addition Postulate
$\overline{FA} + \overline{AN} = \overline{FN}$	
$\overline{FR} + \overline{RN} = \overline{FA} + \overline{AN}$	Substitution
↓ ↓ ↓	
$\overline{AN} + \overline{RN} = \overline{FA} + \overline{AN}$	Substitution
$-\overline{AN}$ $-\overline{AN}$	
$\overline{RN} = \overline{FA}$	Sub POE

d)

Given: ∠1 and ∠2 are complementary.
∠1 ≅ ∠3
∠2 ≅ ∠4

Prove: ∠3 and ∠4 are complementary.
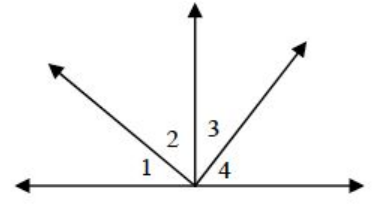
Statement	Reason
∠1 and ∠2 are comp	Given
$\angle 1 + \angle 2 = 90°$	Definition of complementary
$\angle 1 = \angle 3$ $\angle 2 = \angle 4$	Given
$\angle 3 + \angle 4 = 90°$	Substitution
∠3 and ∠4 are complementary	Definition of complementary

$\angle 1 + \angle 2 = 90$
↓ ↓ ↓
$\angle 3 + \angle 4 = 90$

GEOMETRY WORKSHEET---BEGINNING PROOFS

I   Given: $\dfrac{2x-9}{5}=1$ Prove: $x=7$

II. Given: AC = BD
     Prove: AB = CD
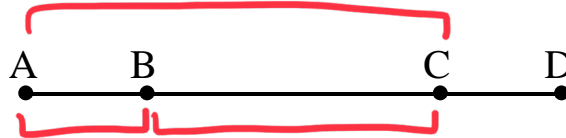
A   B   C   D

1. AC = BD   1. Given

2. AC = AB + BC   2. Seg Add Post
    BD = BC + CD

3. AB + BC = BC + CD   3. Substitution
    −BC −BC

4. AB = CD   4. Sub POE

III. Given: m∠1 = m∠2; m∠3 = m∠4
      Prove: m∠ABC = m∠DEF

A   D   3   1   B   C   E   2   4   F
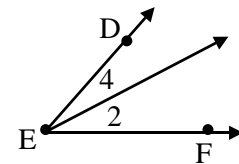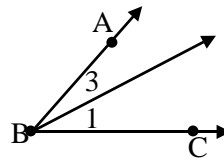
1. m∠1 = m∠2; m∠3 = m∠4   1.

2. m∠1 + m∠3 = m∠2 + m∠4   2.

3. m∠1 + m   3 = m∠ABC   3.
    m∠2 + m∠4 = m∠DEF

4. m∠ABC = m∠DEF   4.
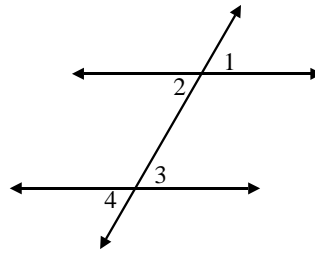
IV. Given: ∠2 ≅ ∠3

Prove: ∠1 ≅ ∠4

1. ∠1 ≅ ∠2	1.
2. ∠2 ≅ ∠3	2.
3. ∠3 ≅ ∠4	3.
4. ∠1 ≅ ∠4	4.

V. Given: ∠1 and ∠2 are complementary
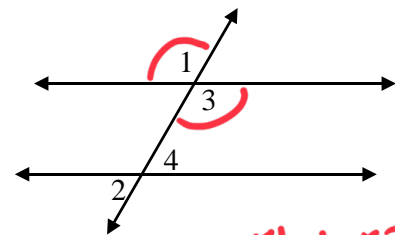
Prove: $\overrightarrow{XA} \perp \overrightarrow{XC}$
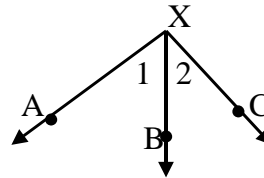
1. ∠1 and ∠2 are complementary	1.
2. m∠1 + m∠2 = _____	2.
3. m∠AXC = m∠1 + m∠2	3.
4. m∠AXC = _____	4.
5. ∠AXC is a right angle	5.
6.	6.

VI. Given: ∠1 and ∠2 are supplementary

Prove: ∠3 and ∠4 are supplementary

1. ∠1 ≟ ∠2 supp	1. Given
2. ∠1 + ∠2 = 180°	2. Def. of supplementary angles
3. ∠1 = ∠3 ∠2 = ∠4	3. Vertical angles are congruent
4. ≅ → =	4. Def. of congruent angles
5. ∠3 + ∠4 = 180°	5. Substitution
6. ∠3 ≟ ∠4 supplementary	6. Def. of supplementary

∠1 + ∠2 = 180°
∠3 + ∠4 = 180°