Chapter 2 Checklist: Reasoning and Proof

Your Name:_____

You MUST complete all of these packet items in order to take your test!

_____2-2 Notes (1 Point)

_____ Standardized Test Prep 2-2

_____ 2-2 Quiz (4 Points)

_____2-3 Notes (1 Point)

_____ Standardized Test Prep 2-3

_____ 2-3 Quiz (3 Points)

_____2-4 Notes (1 Point)

_____ Standardized Test Prep 2-4

_____ 2-4 Quiz (3 Points)

_____2-5 Notes (1 Point)

_____ Standardized Test Prep 2-5

_____ 2-5 Quiz (5 Points)

_____2-6 Notes (1 Point)

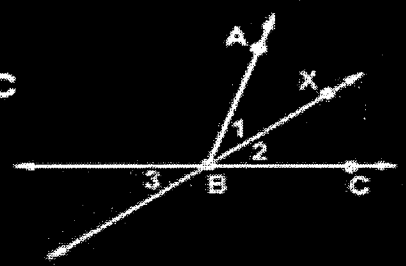
_____ Standardized Test Prep 2-6

_____ 2-6 Quiz (3 Points)

Complete the following proof.

Given: $\overrightarrow{BX}$ bisects $\angle ABC$

Prove: $\angle 1 \cong \angle 3$



STATEMENTS	REASONS
1. $\overrightarrow{BX}$ bisects $\angle ABC$	1. Given
2. $\angle 1 \cong \angle 2$	2. Definition of an $\angle$ Bisector
3. $\angle 2 \cong \angle 3$	

_____ Writing Statements Practice Worksheet

_____ Law of Syllogism and Law of Detachment Practice Worksheet

_____ Angle Pair Relationship Worksheet

_____ 2-6 Games and Puzzles Activity

_____ Reasoning and Proof – Proof Sheet Worksheet

_____ Geometer's Sketchpad Activity

_____ Chapter 2 Performance Task(8 Points)

_____ Chapter 2 Vocabulary Test (10 Points)

_____ Chapter 2 Test (20 Points)

Chapter 2: Reasoning and Proof Vocab List

Conditional Statement

Hypothesis

Conclusion

Converse

Biconditional

Conjecture

Counterexample

Postulate (Axiom)

Theorem

Negate

Law of Syllogism

Law of Detachment

Deductive Reasoning

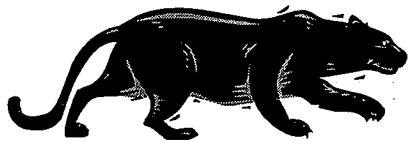
Theorems

- Vertical Angles
- Right Angles are Congruent

Properties

- Addition
- Subtraction
- Multiplication
- Division
- Reflexive
- Symmetric
- Transitive
- Substitution
- Distributive

Name _____
Teacher _____
Class/Period _____
Date _____



Topic: Reasoning and Proof **Patch High School~Home of the Panther**

2.2: Conditional Statements

Summary:

Name _____ Class _____ Date _____

2-2 Standardized Test Prep

Conditional Statements

Multiple Choice

For Exercises 1–4, choose the correct letter.

1. What is the hypothesis of the given statement?

   If pigs had wings, you could fly.

   (A) Pigs have wings.

   (B) You can fly.

   (C) Pigs do not have wings.

   (D) You cannot fly.

2. Which statement is the converse of the given statement?

   If you make an insurance claim, then your rates will go up.

   (F) If your insurance rates do not go up, then you have not made a claim.

   (G) If you do not make an insurance claim, then your rates will not go up.

   (H) If your insurance rates go up, then you have made an insurance claim.

   (I) If you make an insurance claim, then your rates will not go up.

3. Which statement is the contrapositive of the given statement?

   If a person is a banjo player, then the person is a musician.

   (A) If a person is not a musician, then the person is not a banjo player.

   (B) If a person is not a banjo player, then the person is a musician.

   (C) If a person is not a banjo player, then the person is not a musician.

   (D) If a person is a musician, then the person is a banjo player.

4. How are the two statements given below related to each other?

   X: If you run for 10 minutes, then you will raise your heart rate.

   Z: If you do not run for 10 minutes, then you will not raise your heart rate.

   (F) *Z* is the contrapositive of *X*.

   (G) *Z* is the converse of *X*.

   (H) *Z* is the inverse of *X*.

   (I) *Z* is the retrograde of *X*.

Short Response

5. What are the inverse and the contrapositive of the following conditional?

   If a movie is a comedy, then it is funny.

Topic:

2.3: Biconditionals and Definitions

Summary:

Name _____ Class _____ Date _____

2-3 Standardized Test Prep

Biconditionals and Definitions

Multiple Choice

For Exercises 1–3, choose the correct letter.

1. Which statement is a good definition of a rectangle?

   (A) A rectangle is a shape with four sides.

   (B) A rectangle is a shape with two pairs of parallel sides.

   (C) A rectangle is a quadrilateral with four congruent angles.

   (D) A rectangle is a parallelogram with four congruent sides.

2. Conditional: If a triangle is scalene, then the triangle has no congruent sides.

   Which statement shows the conditional written as a true biconditional?

   (F) A triangle is scalene if and only if it has no congruent sides.

   (G) If a triangle has no congruent sides, then the triangle is scalene.

   (H) If a triangle has some congruent sides, then the triangle is not scalene.

   (I) A triangle is equilateral if and only if it is not scalene.

3. Biconditional: A triangle is equilateral if and only if the triangle has three congruent angles.

   Which choice shows the two conditionals that make up the biconditional?

   (A) If a triangle has three sides, then it is equilateral. If the triangle is equilateral, then it has three sides.

   (B) If a triangle is equilateral, then it has three congruent angles. If a triangle has three congruent angles, then it is equilateral.

   (C) If a triangle is scalene, then the triangle is not equilateral. If a triangle is equilateral, then the triangle is not scalene.

   (D) An equilateral triangle has symmetry. If a triangle has symmetry, it is equilateral.

Short Response

4. Write this definition as a true biconditional two different ways.

   Definition: A rhombus is a parallelogram with four congruent sides.

Topic:

2.4: Deductive Reasoning

Summary:

Name _____ Class _____ Date _____

2-4 Standardized Test Prep

Deductive Reasoning

Multiple Choice

For Exercises 1–3, choose the correct letter.

1. Which statement is a valid conclusion based on the argument?

   If a polygon is a regular pentagon, then the polygon has exactly five congruent angles.

   The polygon is a regular pentagon.

   (A) Therefore, the polygon is a rectangle.

   (B) Therefore, the polygon is a regular quadrilateral.

   (C) Therefore, the polygon has exactly five congruent angles.

   (D) Therefore, the polygon has congruent sides.

2. Using the Law of Syllogism, which of the following completes the statement to form a valid conclusion?

   If it is snowing heavily, then school will be canceled.

   If school is canceled, the big test will not be given today.

   It is snowing heavily, therefore

   (F) look out for the snowplows while driving to school.

   (G) the big test will not be given today.

   (H) the roads will be hard to drive on.

   (I) you should call the school to see if school is canceled.

3. Using the Law of Detachment, which statement is a valid conclusion?

   If Jordin has a temperature of 100° or more, then Jordin should stay home from school.

   Jordin has a temperature of 101°.

   (A) Jordin should see the school nurse.

   (B) Jordin should stay home from school.

   (C) Jordin should take his temperature again.

   (D) Jordin has a temperature of 100° or more.

Short Response

4. Use the Law of Syllogism to make a valid conclusion.

   If a blub is screaming, then a frot is swimming.

   If a frot is swimming, then a greep is flinging.

Topic:

2.5: Reasoning in Algebra And Geometry

Summary:

Name _____ Class _____ Date _____

2-5 Standardized Test Prep

Reasoning in Algebra and Geometry

Multiple Choice

For Exercises 1–6, choose the correct letter.

1. According to the Transitive Property of Equality, if $TX = XY$, and $XY = YZ$, then $TX =$ ☐.

   (A) TX (B) XY (C) YZ (D) TZ

2. What property is illustrated by the statement, if $KL = LM$, then $LM = KL$?

   (F) Reflexive Property of Equality
   (G) Symmetric Property of Equality
   (H) Transitive Property of Equality
   (I) Division Property of Equality

Use the list of reasons below for Exercises 3–6. Choose the correct reason for each algebraic statement.

(A) Subtraction Property of Equality
(B) Combine like terms.
(C) Distributive Property
(D) Division Property of Equality

Statements	Reasons
$3(x + 2) + 1 = 8$	Given
$6x + 6 + 1 = 8$	3) ?
$6x + 7 = 8$	4) ?
$6x = 1$	5) ?
$x = \frac{1}{6}$	6) ?

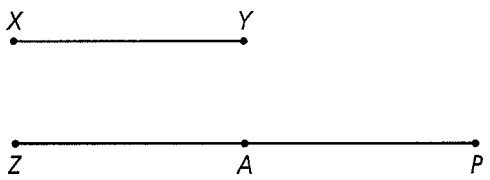
Extended Response

7. Write a two-column proof.

   Given: A is the midpoint of $\overline{ZP}$.

   $XY = ZA$

   Prove: $XY = AP$



Topic:

2.6: Proving Angles Congruent

Summary:

Name _____ Class _____ Date _____

2-6 Standardized Test Prep

Proving Angles Congruent

Multiple Choice

For Exercises 1–5, choose the correct letter.

1. $\angle A$ and $\angle B$ are supplementary, and $\angle A$ and $\angle C$ are supplementary. Which conclusion is valid?

   (A) $\angle B$ and $\angle C$ are supplementary.

   (B) $\angle B$ and $\angle C$ are complementary.

   (C) $\angle B$ and $\angle C$ are acute.

   (D) $\angle B$ and $\angle C$ are congruent.

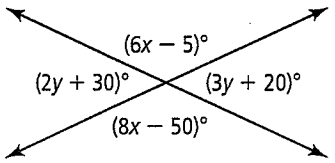
2. The measure of $\angle B$ is one-half the measure of its complement. What is the measure of $\angle B$?

   (F) 30 (G) 45 (H) 60 (I) 90

3. $\angle T$ and $\angle R$ are vertical angles. $m\angle T = 3x + 36$ and $m\angle R = 6x - 9$. What is the measure of $\angle T$?

   (A) 15 (B) 81 (C) 87 (D) 99

Use the figure at the right for Exercises 4 and 5.



4. What is the value of x?

   (F) 8.9 (H) 16.8

   (G) 22.5 (I) 27.5

5. What is the value of y?

   (A) −10 (C) 2

   (B) −2 (D) 10

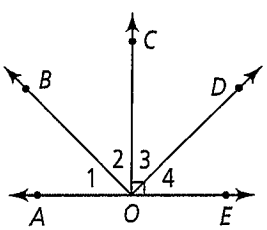
6. $\angle A$ and $\angle B$ are complementary angles. If $m\angle A = 5x - 2$, and $m\angle B = 3x + 4$, what is the value of x?

   (F) 3 (G) 6 (H) 11 (I) 22.25

Short Response

Show Work! Show Proof!

7. In the figure at the right, if $m\angle 1 = 37$, and $\angle 1 \cong \angle 3$, what is $m\angle 4$? Explain.



Name_____ Date_____ Geometry Period _____

Writing Statements Practice

Write the requested statements for each sentence.

Triangles are polygons with three sides.

Conditional	
Converse	
Inverse	
Contrapositive	

A linear pair is a set of supplementary, adjacent angles.

Conditional	
Converse	
Inverse	
Contrapositive	

Complimentary angles are a set of angles whose sum is 90 degrees.

Conditional	
Converse	

Isosceles triangles have 2 congruent sides.

Conditional	
Converse	

Name_____ Date_____ Geometry Period _____

Law of Syllogism and Law of Detachment Practice

Use the Law of Syllogism to make conclusions from the following statements:

If a triangle has angles of 30° and 60°, then its third angle is 90°.
If an angle in a triangle is 90°, then it is a right triangle.

Conclusion: _____

If a triangle is scalene, then it has 3 unequal sides.
If a triangle has 3 unequal sides, then it has 3 unequal angles.

Conclusion: _____

If a quadrilateral is a square, then it has 4 congruent sides.
If a quadrilateral has 4 congruent sides, then it is a rhombus.

Conclusion: _____

Use the Law of Detachment to make conclusions from the following statements:

If angles are a linear pair, then their sum is 180 degrees.

$\angle ABC$ and $\angle DEF$ are a linear pair.

Conclusion: _____

If angles are vertical, then they are congruent.
$\angle 1$ and $\angle 2$ are vertical angles.

Conclusion: _____

If M is the midpoint of a segment, then it divides the segment into two congruent segments.
M is the midpoint of $\overline{AB}$.

Conclusion: _____

Use the Laws of Syllogism and Detachment to make conclusions from the following statements:

If a mountain is the highest in Alaska, then it is the highest in the United States.
If an Alaskan mountain is over 20,300 ft high, then it is the highest in Alaska.
Alaska's Mount McKinley is 20,320 ft high.

Conclusion: _____

If a polygon is a triangle, then it has only 3 interior angles.
If a polygon has only 3 interior angles, then the sum of the angles is 180 degrees.
Polygon ABC is a triangle.

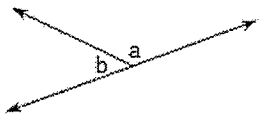
Conclusion: _____

Name_____ Date_____ Geometry Period _____

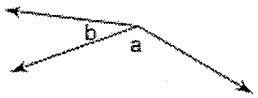
Angle Pair Relationship Sheet

Name the relationship: complementary, linear pair, vertical, or adjacent.

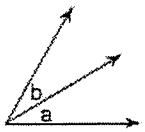
1)



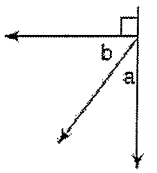
2)



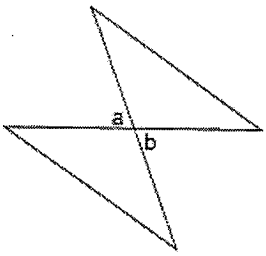
3)



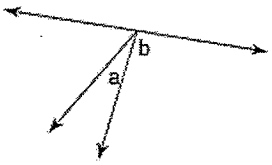
4)



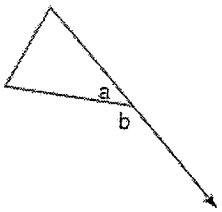
5)



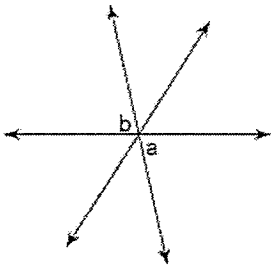
6)



7)

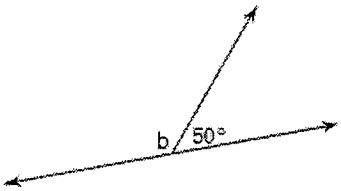


8)

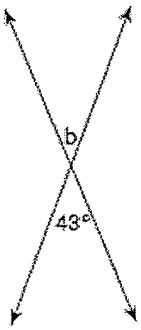


Find the measure of angle b.

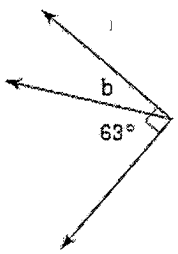
9)



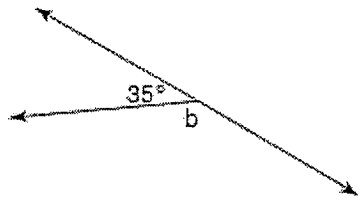
10)



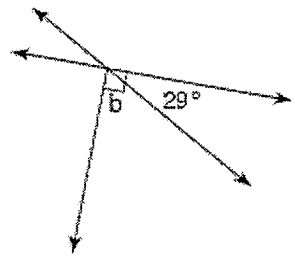
12)



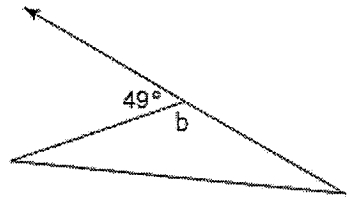
13)



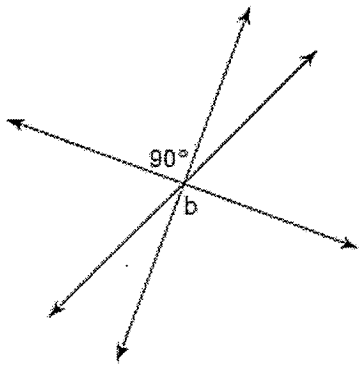
14)



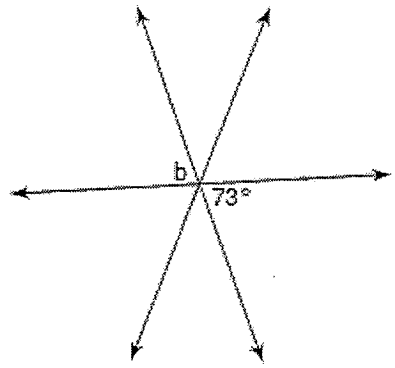
16)



17)

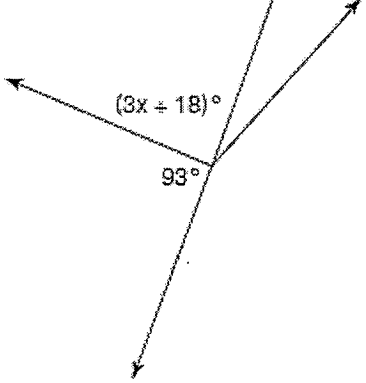


18)

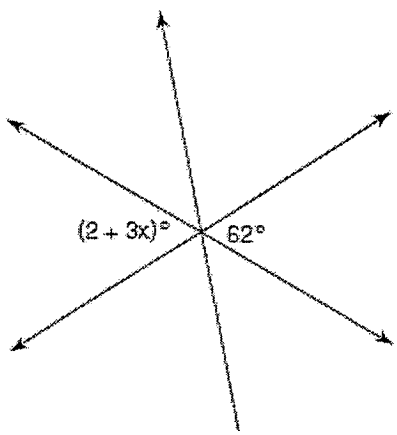


Find the value of x.

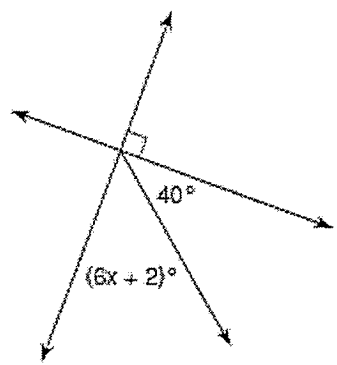
19)



21)



22)

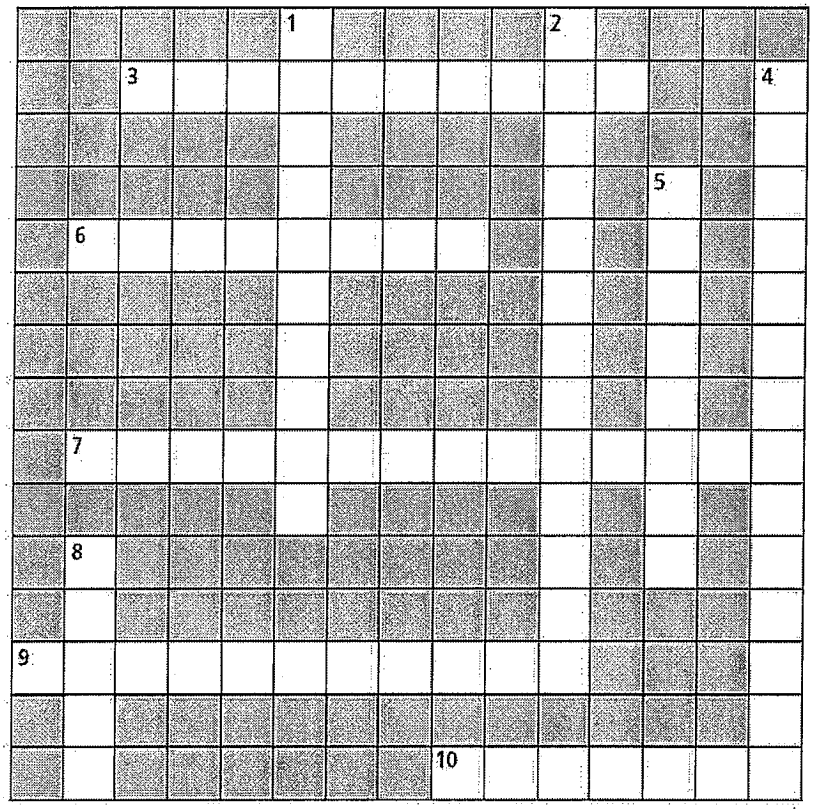


Name _____ Class _____ Date _____

2-6 Puzzle: Crossword

Proving Angles Congruent

Each clue below describes a vocabulary word from this chapter. Write the vocabulary word in the appropriate place in the crossword puzzle.



Across

3. this part of a conditional statement comes after the "if" in "if-then" form

6. a conditional statement that exchanges the hypothesis and conclusion

7. this variation of a conditional statement always shares the same truth value as the original conditional statement

9. also known as an "if-then" statement

10. a statement that negates both the hypothesis and the conclusion of a given conditional statement

Down

1. a conclusion one reaches using inductive reasoning

2. a true statement that combines a true conditional statement and its true converse

4. an example that shows why a conjecture is wrong

5. When you change the truth value of a given conditional statement, you get a ____?____.

8. a logically constructed argument that shows why a conjecture is true

Name _____

Date_____

Geometry Period _____

Reasoning and Proof – Proof Sheet

Use the following website to practice completing proofs: http://feromax.com/cgi-bin/ProveIt.pl

You will need to complete all of the following proofs:

Complementary Angles

Supplementary Angles

Straight Angle

Vertical Angles

After completing all of the above, please copy your work for two of them on this page.

Name_____
Date_____
Geometry Period _____

Geometer's Sketchpad Angle Activity for Reasoning and Proof (Ch 2)

You will need to follow the directions below in geometer's sketchpad. All of this should be completed on one document.

Vertical Angles Activity

1. Create 2 intersecting lines. Make sure you put a point at the point of intersection.
2. Measure a set of vertical angles. To measure an angle: Select 3 Points on the angle (the vertex must be selected in the middle), Choose **Measure** Menu, then **Angle**.
3. Wiggle each line and find out what happens to the vertical angles.
4. Answer the question: What is always true about vertical angles?

_____

Linear Pair Activity

1. Create 2 intersecting lines.
2. Measure each angle in a linear pair. See directions above about measuring angles.
3. Use the **Measure** menu and select **Calculate** to find the sum of the angles in the linear pair. To do this: Click on the first angle measurement on the document. Click on the plus sign. Click on the second angle measurement on the document. Click OK.
4. Wiggle each line and find out what happens to the sum of the angles.
5. Answer the question: What is always true about a linear pair?

_____

After you have completed the steps above, save the document in the folder listed below:
Stud. Common Drive →mary.gruver Folder→ Classes folder→ Select Your Period→Share
Make sure you call it "Sketchpad Angle Activity" followed by your last name and your partner's last name if you had one. Ex: SketchpadAnglesActivityGruverCarson

Name_____
Date_____
Geometry Period _____
Chapter 2: Reasoning and Proof Performance Task

Task 1

All of the following questions in Task 1 concern the following sentence:

A linear pair is a set of angles that add up to 180 degrees.

a. Explain why the sentence above is not a good definition.

b. Rewrite the statement as a conditional statement. Is the conditional a true statement?

c. Write the converse of the conditional statement. Is the converse a true statement?

d. Rewrite the conditional statement so that it is true and its converse is true.

Task 2

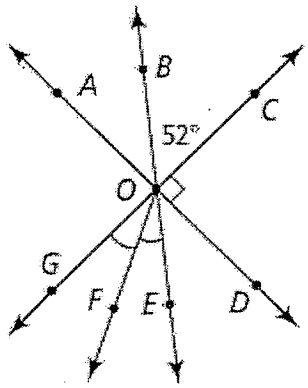
a. Write a good definition for a rectangle. (Note: This will not have **if** and **then** in it.)

b. Write a conditional statement for your definition. Is the conditional statement true?

c. Write a converse for the statement above. Is the converse statement true?

d. Write the definition as a biconditional.

Task 3



a. Describe a two pairs of congruent angles formed by intersecting lines in the diagram at the right. Justify how you know they are congruent.

Congruent Angles (Use symbols!)	**Reason**
1.	1.
2.	**2.**

b. Find the actual numeric measures of two angles in the diagram whose measure is not labeled. Explain how you determined the measurements by including REASONS.