

CCA2 Information Sheet

MA.912.GR.1.1 PRF	Prove relationships and theorems about lines and angles.
Prereq	Identifies the correct algebraic property used in one step of an algebraic proof.
Level 2	Identifies the last reason of a two-column proof about lines and angles.
Level 3	Identifies up to two missing statements and/or reasons of a two-column, flowchart, or informal proof about lines and angles.
Level 4	Completes a proof about lines and angles
Level 5	Analyzes a proof about lines and angles to determine a potential error

MA.912.GR.1.1 ALG	Solve mathematical and real-world problems involving postulates, relationships and theorems of lines and angles.
Prereq	Identifies the correct relationship between two given segments or angles.
Level 2	Solves mathematical problems that include numerical values involving postulates, relationships, and theorems of lines and angles.
Level 3	Uses algebraic equations to solve mathematical problems involving postulates, relationships, and theorems of lines and angles.
Level 4	Solves mathematical or real-world problems involving postulates, relationships, and theorems of lines and angles.

- Postulates, Relationships, and Theorems:
 - All properties of Equality & Congruence, Distributive Property
 - Segment/Angle Addition Postulates
 - Supplementary, Complementary, Bisected, Congruent, Vertical

MA.912.LT.4.3	Identify and accurately interpret "if...then," "if and only if" , "all" and "not" statements. Find the converse, inverse, and contrapositive of a statement.
Prereq	Given a hypothesis and conclusion, identifies the appropriate conditional statement.
Level 2	Identifies the hypothesis and conclusion of a statement and rewrites it in “if. . . then” form.
Level 3	Identifies the converse and inverse of a given conditional statement and/or rewrites a bi-conditional statement as two conditional statements.
Level 4	Identifies and accurately interprets “if. . . then,” “if and only if,” “all” and “not” statements, and finds the converse, inverse, and contrapositive of a statement.
Level 5	Identifies and accurately interprets “if. . . then,” “if and only if,” “all” and “not” statements, and finds the converse, inverse, and contrapositive of a statement and connects to proofs.

- All the problems related to this benchmark contain non-mathematical, real-world scenarios.
 - Example: “If it is Tuesday, then it rains.”

MA.912.LT.4.10	Judge the validity of arguments and give counterexamples to disprove statements.
Prereq	Determines the truth value of a given statement.
Level 2	Identifies the valid statement from a series of arguments about the same topic.
Level 3	Identifies a counterexample to disprove statements in an argument for a particular theorem.
Level 4	Judges the validity of arguments and gives counterexamples to disprove statements.
Level 5	Improves an argument using valid examples.

On Level Courses: 16 Questions (Levels 1 – 4*)

- *Level 4 questions weighted at 0.25

Honors Courses: 15 Questions (Levels 2 – 5* only)

- *Level 5 questions weighted at 0.25

CCA2 Review

• MA.912.GR.1.1 Proofs

1. **Prerequisite:** Select the correct response for the missing reason in the algebraic proof below.

Given: $3x - 2(x + 1) = 23$

Prove: $x = 25$

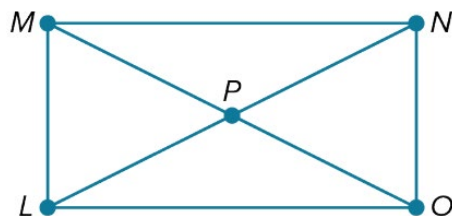
Statements	Reasons
1. $3x - 2(x + 1) = 23$	1. Given
2. $3x - 2x - 2 = 23$	2. (Addition Property of Equality, Subtraction Property of Equality, Distributive Property , Combine like terms / Simplify)
3. $x - 2 = 23$	3. Combine like terms / Simplify
4. $x = 25$	4. Addition Property of Equality

2. **Level 2:** Select the correct response for the missing reason in the geometric proof below.

Given:

- $\overline{MP} \cong \overline{LP}$
- $\overline{LN} \cong \overline{MO}$

Prove: $PN = PO$



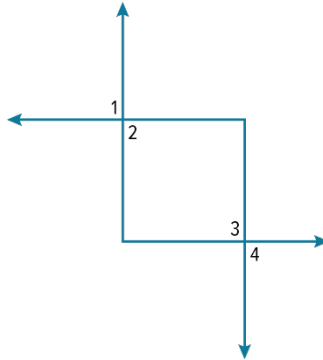
Statements	Reasons
1. $\overline{MP} \cong \overline{LP}; \overline{LN} \cong \overline{MO}$	1. Given
2. $MP = LP; LN = MO$	2. Definition of Congruent
3. $MO = MP + PO; LN = LP + PN$	3. Segment Addition Postulate
4. $LP + PN = MP + PO$	4. Substitution Property of Equality
5. $LP + PN = LP + PO$	5. Substitution Property of Equality
6. $PN = PO$	6. (Definition of Congruent, Segment Addition Postulate, Subtraction Property of Equality , Substitution Property of Equality, Reflexive Property of Equality)

3. **Level 3:** Select the correct responses for the missing statements or reasons in the geometric proof below.

Given:

- $\angle 1 \cong \angle 3$
- $m\angle 3 = 90^\circ$

Prove: $\angle 2$ & $\angle 4$ are supplementary.



Statements	Reasons
1. $\angle 1 \cong \angle 3$; $m\angle 3 = 90^\circ$	1. Given
2. $m\angle 1 = m\angle 3$	2. Definition of Congruent
3. $m\angle 1 = 90^\circ$	3. Substitution Property of Equality
4. $m\angle 1 = m\angle 2$; $m\angle 3 = m\angle 4$	4. (Symmetric Property of Equality, Transitive Property of Equality, Reflexive Property of Equality, Vertical angles are congruent , Vertical angles are complementary)
5. $m\angle 2 = 90^\circ$; $m\angle 4 = 90^\circ$	5. Substitution Property of Equality
6. $m\angle 2 + m\angle 4 = 180^\circ$	6. Angle Addition Postulate
7. $\angle 2$ & $\angle 4$ are supplementary	7. (Definition of Congruent, Definition of Supplementary , Definition of Vertical Angles, Substitution Property of Equality)

4. **Level 4:** Select the correct responses for the missing statements or reasons in the geometric proof below.

Given:

- X , Y , and Z are collinear.
- Y is between X and Z .
- $XY = 2x + 2$
- $YZ = 5x - 3$
- $XZ = 34$

Prove: $YZ = 22$

Statements	Reasons
1. X , Y , and Z are collinear; Y is between X and Z .	1. Given
2. $XZ = XY + YZ$	2. (Addition Property of Equality, Segment Addition Property, Substitution Property of Equality, Transitive Property of Equality)
3. $XY = 2x + 2$; $YZ = 5x - 3$; $XZ = 34$	3. Given
4. $2x + 2 + 5x - 3 = 34$	4. (Addition Property of Equality, Segment Addition Property, Substitution Property of Equality, Transitive Property of Equality)
5. ($7x - 5 = 34$; $7x - 1 = 34$; $3x - 5 = 34$; $3x - 1 = 34$)	5. Combine Like Terms / Simplify
6. $7x = 35$	6. (Addition Property of Equality, Subtraction Property of Equality, Multiplication Property of Equality, Division Property of Equality)
7. ($x = 3$; $x = 4$; $x = 5$; $x = 6$; $x = 7$)	7. Division Property of Equality
8. $YZ = 5(5) - 3$	8. (Addition Property of Equality, Multiplication Property of Equality, Substitution Property of Equality, Transitive Property of Equality, Combine Like Terms/Simplify)
9. $YZ = 22$	9. (Addition Property of Equality, Multiplication Property of Equality, Substitution Property of Equality, Transitive Property of Equality, Combine Like Terms/Simplify)

5. Level 5:

Students were asked to complete a paragraph proof to prove the statement: “If two congruent angles form a linear pair, then they are right angles.”

Timmy T. incorrect answer is below, identify his error.

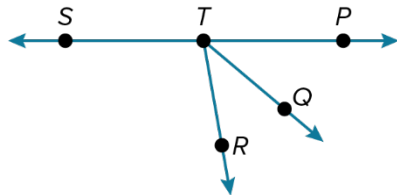
If two congruent angles, $\angle 1$ & $\angle 2$, form a linear pair, then $m\angle 1 + m\angle 2 = 180^\circ$ (definition of a linear pair) and $m\angle 1 = m\angle 2$ (definition of congruent). We can say that $m\angle 1 + m\angle 1 = 180^\circ$ by the Substitution Property of Equality; we can combine like terms/simplify to then have $2 \cdot m\angle 1 = 180^\circ$. Using the Division Property of Equality our equation is now $m\angle 1 = 90^\circ$. By the Substitution Property of Equality, $m\angle 2 = 90^\circ$. Therefore, two congruent angles that form a linear pair are both right angles, by the definition of right angles.

Identify the error:

- A. For the phrase $m\angle 1 = m\angle 2$, the reasoning should have been (vertical angles are congruent)
- B. For the phrase $m\angle 1 + m\angle 2 = 180^\circ$, the reasoning should have been (linear pairs are supplementary)
- C. Switch the 2nd sentence with the 3rd sentence.
- D. Switch the 3rd sentence with the 4th sentence.
- E. There isn't an error in Timmy T's paragraph proof.

• MA.912.GR.1.1 Algebraic Concepts

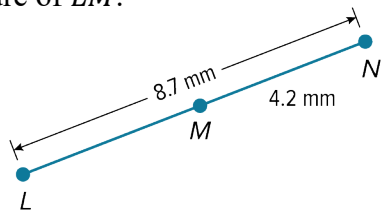
6. **Prerequisite:** Consider the figure below.



Identify the pair of opposite rays.

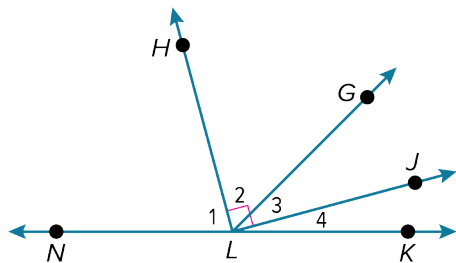
- A. $\overrightarrow{TR}$ & $\overrightarrow{TP}$
- B. $\overrightarrow{TQ}$ & $\overrightarrow{TP}$
- C. $\overrightarrow{TS}$ & $\overrightarrow{TP}$
- D. $\overrightarrow{TR}$ & $\overrightarrow{TS}$

7. **Level 2:** Find the measure of $\overline{LM}$.



- $LM = \underline{\hspace{2cm}}$ (4.5)

8. **Level 3:** Consider the figure below.



If $m\angle NLH = (3x + 5)^\circ$ and $m\angle JLK = (6x - 23)^\circ$, find $m\angle NLH$ and $m\angle JLK$.

- $m\angle NLH = \underline{\hspace{2cm}}$ (12° , 22° , 41° , 49° , 71° , 90° , 109°)
- $m\angle JLK = \underline{\hspace{2cm}}$ (12° , 22° , 41° , 49° , 71° , 90° , 109°)

9. **Level 4:** Find the coordinates of the missing endpoint, C , if B is the midpoint of $\overline{AC}$ and if $A(2,1)$ and $B(10,4)$

- The coordinates of the missing endpoint C are: (_____, _____) (18, 7)

- MA.912.LT.4.3

10. **Prerequisite:** Given the hypothesis and conclusion statements below, identify the appropriate conditional statement.

- Hypothesis = I am a Florida State fan
 - Conclusion = I am having a great September
- A. If I am having a great September, then I am a Florida State fan.
B. If I am not having a great September, then I am not a Florida State fan.
C. If I am not a Florida State fan, then I am not having a great September.
D. If I am a Florida State fan, then I am having a great September.

11. **Level 2:** Given the statement below, identify the hypothesis and the conclusion.

On Saturdays, we do not have school.

Check the box to indicate whether the phrase represents the hypothesis or the conclusion.

Phrase	Hypothesis	Conclusion
On Saturdays	X	
We do not have School		X

12. **Level 3:** Identify the converse of the following conditional statement:

“If you do not come to class on time, then you are considered tardy.”

- A. You are tardy if and only if you do not come to class on time.
B. If you come to class on time, then you are not considered tardy.
C. If you are not considered tardy, then you came to class on time.
D. If you are considered tardy, then you did not come to class on time.

13. **Level 4:** Consider the conditional statement: “If it rains, then it pours.”

Match the statements with their correct label.

- Converse = _____ (B)
 - A. If it is not pouring, then it is not raining.
 - B. If it is pouring, then it is raining.
 - C. If it is not raining, then it is not pouring.
 - D. It is pouring if and only if it is raining.
- Inverse = _____ (C)
- Contrapositive = _____ (A)

14. **Level 5:** Consider the statement: “If you live in Sarasota, then you live in Florida.”

Part A: Is the conditional statement true? _____ (yes)

Part B: Write the converse of the conditional statement given. (If you live in Florida, then you live in Sarasota.)

Part C: Is the converse a valid statement? (no)

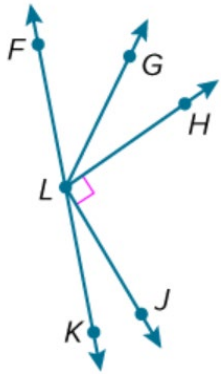
Part D: Can you write the original conditional statement as a biconditional? (no)

Part E: If applicable, identify the biconditional statement.

- A. If you do not live in Sarasota, then you do not live in Florida.
- B. You live in Florida if and only if you live in Sarasota.
- C. If you do not live in Florida, then you do not live in Sarasota.
- D. If you live in Florida, then you live in Sarasota.
- E. Not applicable because it cannot be written as a biconditional.

• MA.912.LT.4.10

15. **Prerequisite:** Given the figure below, consider the statement: “ $\angle GLH$ and $\angle HLJ$ are complementary angles.”

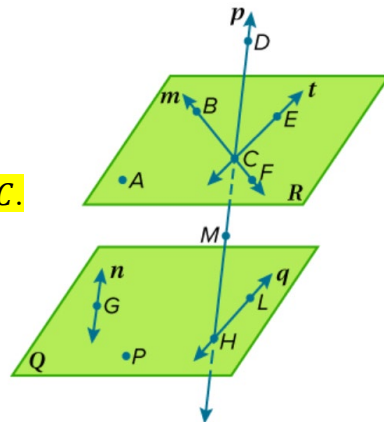


Which of the following is correct?

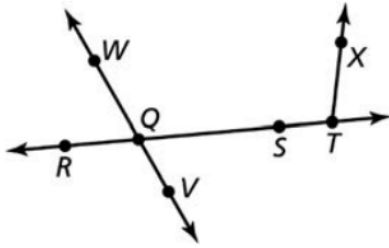
- A. The statement is false because the angles are supplementary.
- B. The statement is true because the sum of the angles is 90° .
- C. The statement is false because the sum of the angles is not 90° .
- D. The statement is false because adjacent angles cannot be complementary.

16. **Level 2:** Given the figure below, determine which of the following statements are true. Select all that apply.

- A. Lines t and n are coplanar.
- B. Points D , C , and M are collinear.
- C. Planes R and Q intersect at $\overline{DH}$.
- D. Lines q and n are coplanar.
- E. Lines t and m intersect at point C .



17. **Level 3:** Given the figure below, consider the statement, " $RT = RQ + QT$."



Which of the following statements is a counterexample?

- A. $RT = RS + ST$
- B. $RT = RQ + ST$
- C. $RT = RS + QT$
- D. $RT = RQ + QS$

18. **Level 4:**

Part A: Determine which of the following are valid statements.

- I. If two lines are coplanar, then they intersect. (False)
- II. If two angles are supplementary, then they must be adjacent. (False)
- III. If two line segments are congruent to another segment, then they are congruent to each other. (True)

Part B: Describe/draw a counterexample if applicable.

- I. Two parallel lines on the same plane
- II. Two angles that are not adjacent that are supplementary
- III. No counterexample for a valid statement

19. **Level 5:** Mr. Haggins overheard a student incorrectly say, “If two angles are congruent, then they are vertical angles.”

Mr. Haggins asked the student to revise the statement to make it valid. Select all of the appropriate and valid statements the student could say.

- A. If two angles are congruent, then they cannot be vertical angles.
- B. If two angles are vertical, then they are congruent.
- C. If two angles share a vertex and their opposite sides form lines, then they are vertical and congruent.
- D. If two angles are congruent, then they are a linear pair.
- E. Some congruent angles are vertical angles.
- F. All congruent angles are vertical angles.