

Name: _____
Geometry

Date: _____
Band: _____

Reasoning and Proof Study Guide

2.1 Conditional Statements

1. Write the if-then form, the converse, the inverse, the contrapositive, and the biconditional of the conditional statement "A leap year is a year with 366 days."

Write the if-then form, the converse, the inverse, the contrapositive, and the biconditional of the conditional statement.

2. Two lines intersect in a point.

3. $4x + 9 = 21$ because $x = 3$.

4. Supplementary angles sum to 180° .

5. Right angles are 90° .

2.2 Inductive and Deductive Reasoning

6. What conclusion can you make about the sum of any two even integers?

7. What conclusion can you make about the difference of any two odd integers?

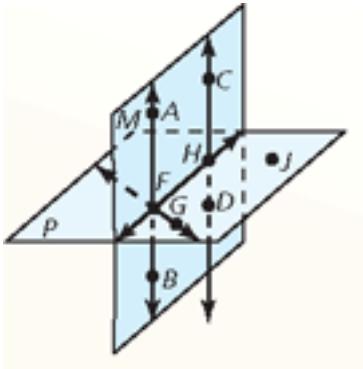
8. What conclusion can you make about the product of an even and an odd integer?

9. Use the Law of Detachment to make a valid conclusion. If an angle is a right angle, then the angle measures 90° . $\angle B$ is a right angle.

10. Use the Law of Syllogism to write a new conditional statement that follows from the pair of true statements: If $x = 3$, then $2x = 6$. If $4x = 12$, then $x = 3$.

2.3 Postulates and Diagrams

11. Use the diagram to make three statements that can be concluded and three statements that *cannot* be concluded. Justify your answers.

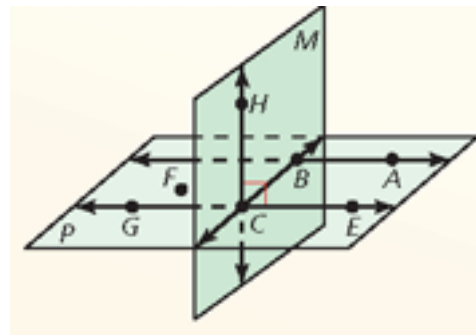


Use the diagram at the right to determine whether you can assume the statement.

12. Points $A, B, C,$ and E are coplanar.

13. $\overrightarrow{HC} \perp \overrightarrow{GE}$

14. Points $F, B,$ and G are collinear.



15. $\overrightarrow{AB} \parallel \overrightarrow{GE}$

Sketch a diagram of the description.

16. $\angle ABC,$ an acute angle, is bisected by $\overrightarrow{BE}.$

17. $\angle CDE,$ a straight angle, is bisected by $\overrightarrow{DK}.$

18. Plane P and plane R intersect perpendicularly in $\overrightarrow{XY}.$ \overrightarrow{ZW} lies in plane $P.$

2.4 Algebraic Reasoning

19. Solve $2(2x + 9) = -10$. Justify each step.

Solve the equation. Justify each step.

20. $-9x - 21 = -20x - 87$

21. $15x + 22 = 7x + 62$

22. $3(2x + 9) = 30$

23. $5x + 2(2x - 23) = -154$

Name the property of equality that the statement illustrates.

24. If $LM = RS$ and $RS = 25$, then $LM = 25$.

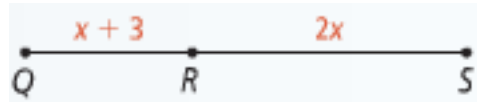
25. $AM = AM$

2.5 Proving Statements about Segments and Angles

26. Fill in the reason that justifies each step.

Given: $QS = 42$

Prove: $x = 13$



Statements	Reasons
1. $QS = 42$	1. _____
2. $QR + RS = QS$	2. _____
3. $(x + 3) + 2x = 42$	3. _____
4. $3x + 3 = 42$	4. _____
5. $3x = 39$	5. _____
6. $x = 13$	6. _____

Name the property that the statement illustrates.

27. If $\angle DEF \cong \angle JKL$, then $\angle JKL \cong \angle DEF$.

28. $\angle C \cong \angle C$

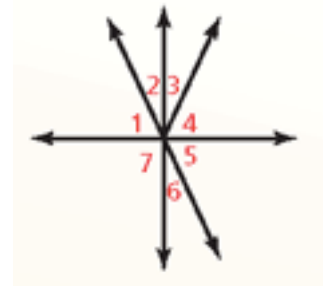
29. If $MN = PQ$ and $PQ = RS$, then $MN = RS$.

2.6 Proving Geometric Relationships

31. Rewrite the two-column proof into a paragraph proof.

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

Prove: $\angle 3 \cong \angle 6$



Two-Column Proof

Statements	Reasons
1. $\angle 2 \cong \angle 3$	1. Given
2. $\angle 2 \cong \angle 6$	2. Vertical Angles Congruence Theorem
3. $\angle 3 \cong \angle 6$	3. Transitive Property of Angle Congruence

32. Write a proof.

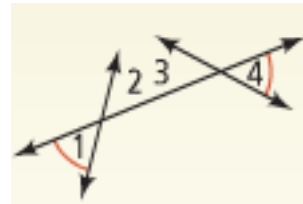
Given: $\angle 3$ and $\angle 2$ are complementary. $m\angle 1 + m\angle 2 = 90^\circ$

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

33. Write a proof.

Given: $\angle 1 \cong \angle 4$

Prove: $\angle 2 \cong \angle 3$



34. Write a proof.

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

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

