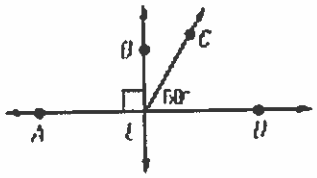
Name: _____ Class: _____ Date: _____ ID: A

Geometry and Advanced Geometry, Chapter 2 Test

Decide whether *inductive* or *deductive* reasoning is used to reach the conclusion. *Explain* your reasoning.

1. For the past 6 weeks, your aunt has asked you to watch your cousin on Wednesday night. You conclude that you will be asked to watch your cousin next Wednesday.

Decide whether the statement about the diagram is true. Explain your answer using definitions you have learned.



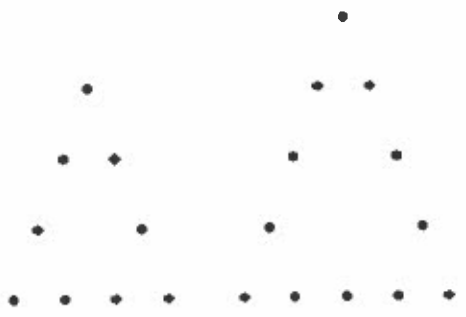
2. $m\angle BEC = 30^\circ$

3. $\angle BEC$ and $\angle CED$ are a linear pair.

4. $m\angle AEB = 90^\circ$

5. Name the property which justifies the following conclusion:
   Given: $18x = 288$
   Conclusion: $x = 16$

6. Look at the set of dots below. Sketch the next figure, and predict the total number of dots in the 6th figure.



Name: _____ ID: A

Identify the property that makes the statement true.

7. If $m\angle 1 + m\angle 2 = 25°$ and $m\angle 1 = 9°$, then $9° + m\angle 2 = 25°$.

8. If $MP = PQ$ and $PQ = QR$, then $MP = QR$.

9. If $m\angle P = m\angle R$ and $m\angle R = m\angle T$, then $m\angle P = m\angle T$.

10. If $XY = MN$, then $MN = XY$.

____ 11. If $PQ = 3$ and $PQ + RS = 5$, then $3 + RS = 5$ is an example of the _____.
   a. Substitution Property of Equality
   b. Multiplication Property of Equality
   c. Transitive Property of Equality
   d. Reflexive Property of Equality

12. Rewrite the definition "An equilateral triangle has three sides that are equal in length" as a biconditional.

Use inductive reasoning to find the next two numbers in each pattern.

13. 2, 3, 5, 8, __, __

14. 2, 4, 8, 16, __, __

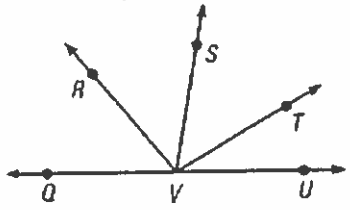
15. –9, –5, –1, 3, __, __

___ 16. Give the reason for the last statement in the proof.

Statement	Reason
$\angle 1$ and $\angle 2$ are a linear pair.	Given
$\angle 1$ and $\angle 2$ are supplementary.	?

a. Linear Pair Postulate
b. Congruent Complements Theorem
c. Vertical Angles Congruence Theorem
d. Congruent Supplements Theorem

17. (bonus, 1 pt) $\angle QVR \cong \angle RVS$ and $\angle RVS \cong \angle SVT$. If $m\angle TVU = 30°$, what is $m\angle QVR$? Justify your answer.

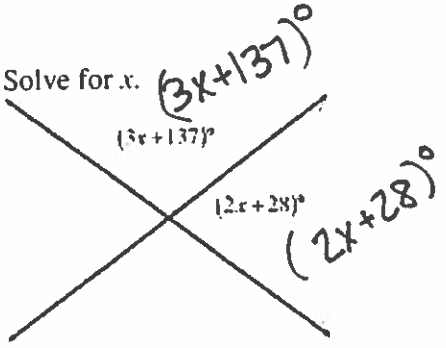


___ 18. $\angle 1$ and $\angle 2$ form a linear pair. If $m\angle 2 = 67°$, what is $m\angle 1$?

a. 23°
b. 33°
c. 113°
d. 67°

19. Name the property which justifies the following conclusion:
Given: $b + c - d = e$ and $d = a$
Conclusion: $b + c - a = e$

___ 20. Solve for x.



a. 3
b. 6
c. 1
d. 2

21. Give the reason for the last statement in the proof.

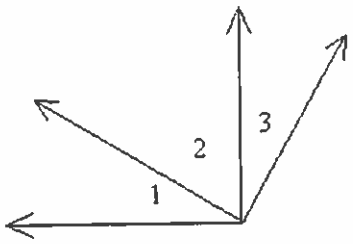
Statement	Reason
$\angle 1$ is a supplement of $\angle 2$.	Given
$\angle 3$ is a supplement of $\angle 4$.	Given
$\angle 2 \cong \angle 4$	Given
$\angle 1 \cong \angle 3$	?

a. Congruent Supplements Theorem
b. Congruent Complements Theorem
c. Vertical Angles Congruence Theorem
d. Linear Pair Postulate

22. From the given information, make a valid conclusion.

If Isaiah walks the tightrope, he will fall.
If Isaiah falls, he will get hurt.

23. $\angle 1$ is complementary to $\angle 2$; $\angle 3$ is complementary to $\angle 2$. What theorem, property, or postulate allows you to state that $\angle 1 \cong \angle 3$?

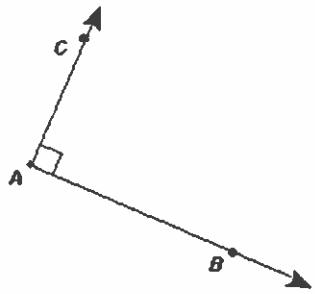


Use the diagram to write an example of the postulate.

24. If two lines intersect, then their intersection is exactly one point.

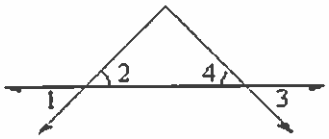
25. Through any two points there exists exactly one line.

____ 26. The figure below represents which of the following statements?



a. Two rays that are perpendicular
b. A straight angle
c. $AB = AC$
d. Two lines that are perpendicular

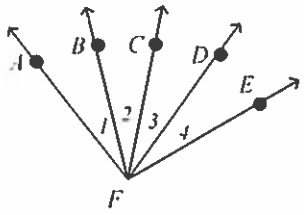
27. Complete the proof.
Given: $\angle 2 \cong \angle 4$
Prove: $\angle 1 \cong \angle 3$



Statement	Reason
1. ?	1. ?
2. $\angle 1 \cong \angle 2; \angle 4 \cong \angle 3$	2. ?
3. $\angle 1 \cong \angle 4$	3. ?
4. ?	4. ?

28. Rewrite the postulate in if-then form.
"A line contains at least two points."

29. Provide the reasons for each statement in the proof.
Given: $m\angle 1 = m\angle 3$
Prove: $m\angle AFC = m\angle DFB$



Statement	Reason
$m\angle 1 = m\angle 3$	?
$m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	?
$m\angle 1 + m\angle 2 = m\angle AFC,\ m\angle 3 + m\angle 2 = m\angle DFB$	?
$m\angle AFC = m\angle DFB$	?

30. Provide the reasons for each statement in the proof.
Given: $AB = DE$
Prove: $AD = BE$

Statement	Reason
$AB = DE$	?
$AB + BD = DE + BD$	?
$AB + BD = AD, DE + BD = BE$	?
$AD = BE$	?

____ 31. Decide which one of the following statements is false.
a. Three noncollinear points determine a plane.
b. A line contains at least two points.
c. Through any two distinct points there exists exactly one line.
d. Any three points lie on a distinct line.

32. Identify the hypothesis and conclusion of the statement.
If today is Wednesday, then tomorrow is Thursday.

From the given true statements, make a valid conclusion:

33. If the dogs get out of the yard, the catcher will take them to the pound.
The dogs got out of the yard.

____ 34. Give the reason for the last statement in the proof.

Statement	Reason
$\angle 1$ and $\angle 2$ are vertical angles.	Given
$\angle 1 \cong \angle 2$	?

a. Vertical Angles Congruence Theorem
b. Congruent Complements Theorem
c. Congruent Supplements Theorem
d. Linear Pair Postulate

Geometry and Advanced Geometry, Chapter 2 Test
Answer Section

1. ANS:
Inductive reasoning; the conclusion is based on a pattern that has developed over the last 6 weeks.

PTS: 1 DIF: Level C REF: GEO.02.03.SR.10
LOC: NCTM.PSSM.00.MTH.9-12.REA.1
TOP: Lesson 2.3 Apply Deductive Reasoning
KEY: Short Response | inductive reasoning | deductive reasoning
MSC: DOK 3 NOT: 978-0-547-31534-8

2. ANS:
This statement is true. Because angles *BEC* and *CED* are complementary, the sum of their measures is 90 degrees. Therefore, $m\angle BEC = 30^{\circ}$.

PTS: 1 DIF: Level B REF: 7f5fac3c-cdbb-11db-b502-0011258082f7
TOP: Lesson 2.2 Analyze Conditional Statements
KEY: Definition | complementary angles MSC: DOK 2 NOT: 978-0-547-31534-8

3. ANS:
This statement is false. Because points *B*, *E*, and *D* are not collinear, the angles do not form a linear pair.

PTS: 1 DIF: Level C REF: 7f60e551-cdbb-11db-b502-0011258082f7
TOP: Lesson 2.2 Analyze Conditional Statements
KEY: Definition | complementary angles MSC: DOK 2 NOT: 978-0-547-31534-8

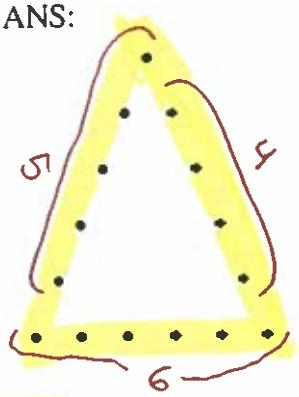
4. ANS:
This statement is true. As indicated in the diagram, $\angle AEB$ is a right angle. Therefore, by definition, its measure is 90 degrees.

PTS: 1 DIF: Level A REF: 7f5f852c-cdbb-11db-b502-0011258082f7
TOP: Lesson 2.2 Analyze Conditional Statements KEY: Definition | right angle
MSC: DOK 2 NOT: 978-0-547-31534-8

5. ANS:
Multiplication property of equality

PTS: 1 DIF: Level B REF: MLGE0455
LOC: NCTM.PSSM.00.MTH.9-12.ALG.2.b
TOP: Lesson 2.5 Reason Using Properties from Algebra
KEY: property | multiplication | algebra | addition | equality | transitive
MSC: DOK 1 NOT: 978-0-547-31534-8

6. ANS:



24

PTS: 1 DIF: Level A REF: MHGM0011
LOC: NCTM.PSSM.00.MTH.9-12.REA.4
TOP: Lesson 2.1 Use Inductive Reasoning KEY: pattern | dots | sketch
MSC: DOK 2 NOT: 978-0-547-31534-8

7. ANS:
Substitution Property of Equality

PTS: 1 DIF: Level A REF: BS022084
LOC: NCTM.PSSM.00.MTH.9-12.ALG.2.b
TOP: Lesson 2.5 Reason Using Properties from Algebra
KEY: property | angle | substitution MSC: DOK 1 NOT: 978-0-547-31534-8

8. ANS:
Transitive Property of Equality

PTS: 1 DIF: Level A REF: BS022083
LOC: NCTM.PSSM.00.MTH.9-12.ALG.2.b
TOP: Lesson 2.5 Reason Using Properties from Algebra
KEY: property | segment | transitive MSC: DOK 1 NOT: 978-0-547-31534-8

9. ANS:
Transitive Property of Equality

PTS: 1 DIF: Level A REF: BS022082
LOC: NCTM.PSSM.00.MTH.9-12.ALG.2.b
TOP: Lesson 2.5 Reason Using Properties from Algebra
KEY: property | angle | transitive MSC: DOK 1 NOT: 978-0-547-31534-8

10. ANS:
Symmetric Property of Equality

PTS: 1 DIF: Level A REF: BS022081
LOC: NCTM.PSSM.00.MTH.9-12.ALG.2.b
TOP: Lesson 2.5 Reason Using Properties from Algebra
KEY: property | segment | symmetric MSC: DOK 1 NOT: 978-0-547-31534-8

11. ANS: A PTS: 1 DIF: Level A REF: MHGT0089
LOC: NCTM.PSSM.00.MTH.9-12.ALG.2.b
TOP: Lesson 2.5 Reason Using Properties from Algebra
KEY: property | substitution | multiplication | transitive | reflexive
MSC: DOK 1 NOT: 978-0-547-31534-8

12. ANS:
A triangle is equilateral if and only if it has three sides that are equal in length.

PTS: 1 DIF: Level B REF: MIM20410
TOP: Lesson 2.2 Analyze Conditional Statements KEY: conditional
MSC: DOK 2 NOT: 978-0-547-31534-8

13. ANS:
12, 17

PTS: 1 DIF: Level C REF: BS021980
LOC: NCTM.PSSM.00.MTH.9-12.ALG.1.a | NCTM.PSSM.00.MTH.9-12.REA.4
TOP: Lesson 2.1 Use Inductive Reasoning
KEY: pattern | number | inductive MSC: DOK 2 NOT: 978-0-547-31534-8

14. ANS:
32, 64

PTS: 1 DIF: Level B REF: BS021974
LOC: NCTM.PSSM.00.MTH.9-12.ALG.1.a | NCTM.PSSM.00.MTH.9-12.REA.4
TOP: Lesson 2.1 Use Inductive Reasoning
KEY: pattern | number | inductive MSC: DOK 2 NOT: 978-0-547-31534-8

15. ANS:
7, 11

PTS: 1 DIF: Level A REF: BS021975
LOC: NCTM.PSSM.00.MTH.9-12.ALG.1.a | NCTM.PSSM.00.MTH.9-12.REA.4
TOP: Lesson 2.1 Use Inductive Reasoning
KEY: pattern | number | inductive MSC: DOK 2 NOT: 978-0-547-31534-8

16. ANS: A PTS: 1 DIF: Level A REF: MHGM0029B
NAT: NT.CCSS.MTH.10.9-12.G.CO.9 TOP: Lesson 2.7 Prove Angle Pair Relationships
KEY: proof | deductive | postulate MSC: DOK 1 NOT: 978-0-547-31534-8

17. ANS:
$m\angle QVR = 50°$ and $m\angle TVU = 30°$. $\angle QVT$ and $\angle TVU$ are supplementary so $m\angle QVT = 180° - 30° = 150°$. $m\angle QVR + m\angle RVS + m\angle SVT = m\angle QVT$ by the Angle Addition Postulate. $\angle QVR \cong \angle SVT$ by the Transitive Property. $m\angle QVR = m\angle RVS$ and $m\angle QVR = m\angle SVT$ by the Definition of Congruence. Using the Substitution Property, $m\angle QVR + m\angle QVR + m\angle QVR = 150°$. Since $3m\angle QVR = 150°$, $m\angle QVR = 50°$ by the Division Property of Equality.

PTS: 1 DIF: Level C REF: GEO.02.06.SR.06
NAT: NT.CCSS.MTH.10.9-12.G.CO.9
LOC: NCTM.PSSM.00.MTH.9-12.ALG.2.b | NCTM.PSSM.00.MTH.9-12.GEO.1.a | NCTM.PSSM.00.MTH.9-12.GEO.1.c | NCTM.PSSM.00.MTH.9-12.REA.3 | NCTM.PSSM.00.MTH.9-12.REA.4 TOP: Lesson 2.7 Prove Angle Pair Relationships
KEY: Short Response | Angle Addition | Supplementary MSC: DOK 3
NOT: 978-0-547-31534-8

18. ANS: C PTS: 1 DIF: Level A REF: MLGE0444
TOP: Lesson 2.7 Prove Angle Pair Relationships
KEY: angle | supplementary | linear pair MSC: DOK 1 NOT: 978-0-547-31534-8

19. ANS:
Substitution property of equality

PTS: 1 DIF: Level B REF: MLGE0454
LOC: NCTM.PSSM.00.MTH.9-12.ALG.2.b
TOP: Lesson 2.5 Reason Using Properties from Algebra
KEY: property | distributive | substitution | algebra | equality | transitive
MSC: DOK 1 NOT: 978-0-547-31534-8

20. ANS: A PTS: 1 DIF: Level B REF: MLGE0199
NAT: NT.CCSS.MTH.10.9-12.A.REI.3
LOC: NCTM.PSSM.00.MTH.9-12.PRS.3 | NCTM.PSSM.00.MTH.9-12.REP.2
TOP: Lesson 2.7 Prove Angle Pair Relationships
KEY: supplementary angles | vertical angles MSC: DOK 2
NOT: 978-0-547-31534-8

21. ANS: A PTS: 1 DIF: Level A REF: MHGM0029A
NAT: NT.CCSS.MTH.10.9-12.G.CO.9 TOP: Lesson 2.7 Prove Angle Pair Relationships
KEY: proof | deductive | postulate MSC: DOK 1 NOT: 978-0-547-31534-8

22. ANS:
If Isaiah walks the tightrope, he will get hurt.

PTS: 1 DIF: Level B REF: MLGE0021C
TOP: Lesson 2.3 Apply Deductive Reasoning
KEY: word | law | logic | conclusion | deductive MSC: DOK 2
NOT: 978-0-547-31534-8

23. ANS:
Congruent Complements Theorem Theorem 2.5

PTS: 1 DIF: Level A REF: MLGM0009
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.c | NCTM.PSSM.00.MTH.9-12.REA.3 | NCTM.PSSM.00.MTH.9-12.REA.4 TOP: Lesson 2.7 Prove Angle Pair Relationships
KEY: proof | complementary angles MSC: DOK 1 NOT: 978-0-547-31534-8

24. ANS:
Lines l_1 and l_2 intersect at exactly one point, namely B. Post 7

PTS: 1 DIF: Level B REF: 7fa001fe-cdbb-11db-b502-0011258082f7
TOP: Lesson 2.4 Use Postulates and Diagrams KEY: Postulate | diagram
MSC: DOK 1 NOT: 978-0-547-31534-8

25. ANS:
Through points A and B, there exists exactly one line, namely l_1. Post 5

PTS: 1 DIF: Level B REF: 7f9fdaee-cdbb-11db-b502-0011258082f7
TOP: Lesson 2.4 Use Postulates and Diagrams KEY: Postulate | diagram
MSC: DOK 1 NOT: 978-0-547-31534-8

26. ANS: A PTS: 1 DIF: Level A REF: MGEH0016
TOP: Lesson 2.2 Analyze Conditional Statements KEY: perpendicular | ray
MSC: DOK 1 NOT: 978-0-547-31534-8

27. ANS:

Statement	Reason
1. $\angle 2 \cong \angle 4$	1. Given
2. $\angle 1 \cong \angle 2; \angle 4 \cong \angle 3$	2. Vertical angles congruence theorem
3. $\angle 1 \cong \angle 4$	3. Transitive property of congruence
4. $\angle 1 \cong \angle 3$	4. Transitive property of congruence

PTS: 1 DIF: Level B REF: BS022093
NAT: NT.CCSS.MTH.10.9-12.G.CO.9
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.c | NCTM.PSSM.00.MTH.9-12.REA.1 | NCTM.PSSM.00.MTH.9-12.REA.3 | NCTM.PSSM.00.MTH.9-12.REA.4
TOP: Lesson 2.7 Prove Angle Pair Relationships KEY: angle | complete | proof
MSC: DOK 2 NOT: 978-0-547-31534-8

28. ANS:
If a figure is a line, then it contains at least two points.

PTS: 1 DIF: Level A REF: MLGE0071
TOP: Lesson 2.4 Use Postulates and Diagrams
KEY: conditional | postulate | if-then MSC: DOK 1 NOT: 978-0-547-31534-8

29. ANS:

Statement	Reason
$m\angle 1 = m\angle 3$	Given
$m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	Addition property of equality
$m\angle 1 + m\angle 2 = m\angle AFC,\ m\angle 3 + m\angle 2 = m\angle DFB$	Angle addition postulate
$m\angle AFC = m\angle DFB$	Substitution property of equality

PTS: 1 DIF: Level A REF: MLGE0180A
TOP: Lesson 2.6 Prove Statements about Segments and Angles
KEY: angle | proof | justification | angle addition MSC: DOK 1
NOT: 978-0-547-31534-8

30. ANS:

Statement	Reason
$AB = DE$	Given
$AB + BD = DE + BD$	Addition property of equality
$AB + BD = AD, DE + BD = BE$	Segment addition postulate
$AD = BE$	Substitution property of equality

PTS: 1 DIF: Level A REF: MLGE0179A
TOP: Lesson 2.6 Prove Statements about Segments and Angles
KEY: segment | proof | segment addition | justification MSC: DOK 2
NOT: 978-0-547-31534-8

31. ANS: D PTS: 1 DIF: Level B REF: MHGT0087
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.a
TOP: Lesson 2.4 Use Postulates and Diagrams KEY: line | point | collinear
MSC: DOK 1 NOT: 978-0-547-31534-8

32. ANS:
hypothesis: today is Wednesday, conclusion: tomorrow is Thursday

PTS: 1 DIF: Level B REF: XEGS0106
TOP: Lesson 2.2 Analyze Conditional Statements
KEY: identify | hypothesis | conclusion MSC: DOK 1 NOT: 978-0-547-31534-8

33. ANS:
The catcher will take them to the pound.

PTS: 1 DIF: Level B REF: MLGE0021F
TOP: Lesson 2.3 Apply Deductive Reasoning
KEY: word | law | logic | conclusion | deductive MSC: DOK 2
NOT: 978-0-547-31534-8

A

34. ANS: A PTS: 1 DIF: Level A REF: MHGM0029C
NAT: NT.CCSS.MTH.10.9-12.G.CO.9 TOP: Lesson 2.7 Prove Angle Pair Relationships
KEY: proof | deductive | postulate MSC: DOK 1 NOT: 978-0-547-31534-8

A 16. A 21. A 26.

A 11.

C 18.

A 20.

D 31.

A 34.