

Geometry A

2.1A Inductive Reasoning and Conjecture ASSIGNMENT

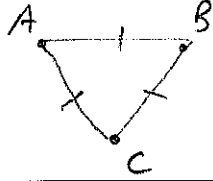
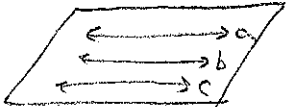
Name Key
 Hour _____ Date _____

1. Suppose $\angle 1$ and $\angle 2$ form a linear pair. What conjecture(s) can you make from this information? (Choose all correct answers.)
 A. $\angle 1$ and $\angle 2$ are supplementary.
 B. $\angle 1$ and $\angle 2$ are complementary.
 C. $\angle 1$ and $\angle 2$ are adjacent.
 D. $\angle 1$ and $\angle 2$ are vertical angles.
2. Suppose M is the midpoint of AB . What conjecture(s) can you make from this information? (Choose all correct answers.)
 A. $AM + AB = MB$
 B. $AB = 2(AM)$
 C. $AM = MB$
 D. $AB = MB$
3. Given: $\angle A$ and $\angle B$ are supplementary.
 Conjecture: $m\angle A = 90$ and $m\angle B = 90$.

Which one of the following is a counterexample to the conjecture?

- A. $m\angle A = 30$ and $m\angle B = 60$
 B. $m\angle A = 45$ and $m\angle B = 45$
 C. $m\angle A = 80$ and $m\angle B = 100$
 D. None of the above statements is a counterexample because the conjecture is true.

For #4-7, show that each conjecture is false by finding a counterexample. The counterexample can be displayed as a drawing or a statement.

<p>4. Given: $\angle 1$ and $\angle 2$ form a linear pair.</p> <p>Conjecture: $\angle 1 \cong \angle 2$</p> <p>Counterexample:</p> <p>$m\angle 1 = 100$ $m\angle 2 = 80$</p>	<p>5. Given: \overline{AB}, \overline{BC}, and \overline{AC} are congruent.</p> <p>Conjecture: A, B, and C are collinear.</p> <p>Counterexample:</p> 
<p>6. Given: 3 lines a, b, and c lie in the same plane.</p> <p>Conjecture: The lines intersect at one point.</p> <p>Counterexample:</p> 	<p>7. Given: 2 acute angles</p> <p>Conjecture: The sum of their measures equals the measure of an obtuse angle.</p> <p>Counterexample:</p> <p>$20^\circ + 30^\circ = 50^\circ$ which is not obtuse.</p>

Review:

8. Find the value of x and ST if S is between R and T , $RS = 3x$, $ST = 5x - 7$, and $RT = 81$.

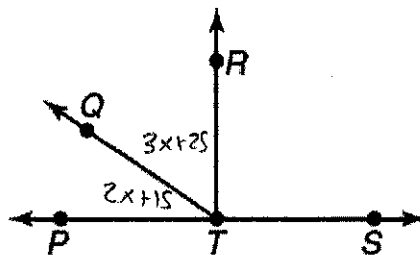
$$x = 11 \quad ST = 48$$

9. Find the distance between $A(-2, 3)$ and $B(5, -4)$

$$d = \sqrt{98} \approx 9.9$$

10. If $m\angle PTQ = 2x + 15$ and $m\angle QTR = 3x + 25$ find the value of x so that $\overrightarrow{TR} \perp \overrightarrow{TS}$.

$$x = 10$$



Geometry A
2.1B Inductive Reasoning and Conjecture

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Complete each proof.

1. Given: $4x + 8 = x + 2$
Prove: $x = -2$

Statements	Reasons
1. $4x + 8 = x + 2$	1. Given
2. $4x + 8 = x + 2$ $-x \quad -x$	2. Subtraction Property
3. $3x + 8 = 2$	3. Substitution Property
4. $3x + 8 = 2$ $-8 \quad -8$	4. Subtraction Property
5. $3x = -6$	5. Substitution Property
6. $\frac{3x}{3} = \frac{-6}{3}$	6. Division Property
7. $x = -2$	7. Substitution Property

2. Given: $\frac{x+5}{2} = 7$
Prove: $x = 9$

Statements	Reasons
1. $\frac{x+5}{2} = 7$	1. Given
2. $(2)\frac{x+5}{2} = 7(2)$	2. Multiplication Property
3. $x + 5 = 14$	3. Substitution
4. $x + 5 = 14$ $-5 \quad -5$	4. Subtraction Property
5. $x = 9$	5. Substitution

For #3-9, select the property that justifies each statement. Write the property on the line provided.

reflexive property	subtraction property	division property
symmetric property	multiplication property	distributive property
transitive property	addition property	substitution property

3. If $5x = 15$, then $5x + 3 = 15 + 3$ Addition Property
4. $2(y - 5) = 2(y) - 2(5)$ Distributive Property
5. If $6n = 42$, then $\frac{6n}{6} = \frac{42}{6}$ Division Property
6. If $8c = 32$, then $32 = 8c$ Symmetric Property
7. $17e = 17e$ Reflexive Property
8. If $y = 5$ and $5 = 2n$, then $y = 2n$ Substitution Property
9. If $4m = 15$, then $2(4m) = 2(15)$ Multiplication Property

Review:

10. Segment AB has endpoints A(-2, 3) and B(4, -7). Find the midpoint. In what quadrant does the midpoint lie?

$(1, -2)$ IV

11. $\angle 1$ and $\angle 2$ are vertical angles. If $m\angle 1 = (7x - 5)^\circ$ and $m\angle 2 = (3x + 19)^\circ$, find the value of x .

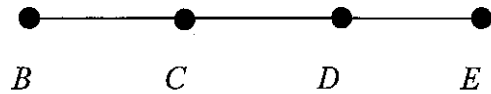
$x = 6$

For #1-12, write the name of the property, definition, or theorem that justifies each statement.

1. If $AB = RS$ and $RS = WY$, then $AB = WY$. Substitution Property
2. If $AB = CD$, then $3AB = 3CD$. Multiplication Property
3. If $m\angle 1 + m\angle 2 = 110^\circ$ and $m\angle 2 = m\angle 3$, then $m\angle 1 + m\angle 3 = 110^\circ$. Substitution Property
4. $RS = RS$ Reflexive Property
5. If $AB = RS$, then $AB + 5 = RS + 5$. Addition Property
6. If $m\angle 4 = m\angle 5$ and $m\angle 5 = m\angle 6$, then $m\angle 4 = m\angle 6$. Transitive Property
7. If $4x = 8$, then $4x - 2 = 8 - 2$. Subtraction Property
8. If $80^\circ = m\angle A$, then $m\angle A = 80^\circ$. Symmetric Property
9. If $\overline{DE} \cong \overline{GH}$ and $\overline{GH} \cong \overline{JK}$, then $\overline{DE} \cong \overline{JK}$. Transitive Property
10. If E is the midpoint of \overline{XY} , then $\overline{XE} \cong \overline{EY}$. Midpoint Theorem
11. If \overline{JL} bisects $\angle AJC$, then $\angle AJL \cong \angle CJL$. Definition of Angle Bisector
12. If $m\angle 3 = m\angle 4$, then $\frac{m\angle 3}{10} = \frac{m\angle 4}{10}$. Division Property

13. Complete the following proof.

Given: C is the midpoint of \overline{BD} .
 D is the midpoint of \overline{CE} .



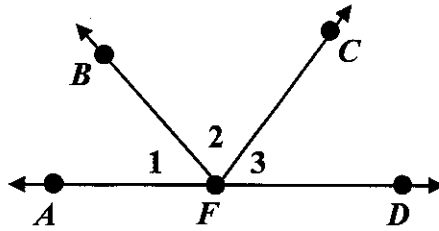
Prove: $\overline{BC} \cong \overline{DE}$

Statements	Reasons
1. C is the midpoint of \overline{BD} .	1. Given
2. D is the midpoint of \overline{CE} .	2. Given
3. $\overline{BC} \cong \overline{CD}$	3. Midpoint Theorem
4. $\overline{CD} \cong \overline{DE}$	4. Midpoint Theorem
5. $\overline{BC} \cong \overline{DE}$	5. Transitive Property

14. Complete the following proof.

Given: \overrightarrow{FB} bisects $\angle AFC$
 \overrightarrow{FC} bisects $\angle DFB$

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



Statements	Reasons
1. \overrightarrow{FB} bisects $\angle AFC$	1. Given
2. \overrightarrow{FC} bisects $\angle DFB$	2. Given
3. $\angle 1 \cong \angle 2$	3. Definition of an angle bisector
4. $\angle 2 \cong \angle 3$	4. Definition of an angle bisector
5. $\angle 1 \cong \angle 3$	5. Transitive Property

Review:

15. $\angle 1$ and $\angle 2$ form a linear pair. If $m\angle 1 = (7x - 5)^\circ$ and $m\angle 2 = (2x + 20)^\circ$, find the value of x .

$$x = \frac{165}{9} = 18\frac{1}{3}$$

16. The measure of the complement of an angle is 11 less than the measure of the angle. Find the measures of the angles.

$$50.5^\circ \text{ and } 39.5^\circ$$

Geometry A
2.3 Geometric Proofs with Addition

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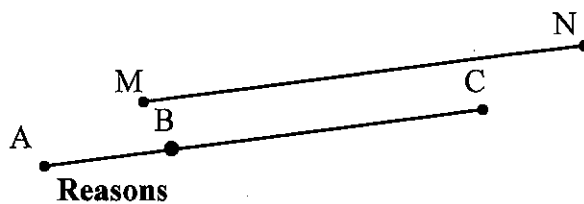
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For #1-20, state the property, definition, theorem, or postulate that justifies each statement.

1. $QA = QA$. Reflexive
2. If $\overline{AB} \cong \overline{BC}$ and $\overline{BC} \cong \overline{CE}$, then $\overline{AB} \cong \overline{CE}$. Transitive
3. If Q is between P and R , then $PQ + QR = PR$. Segment Addition Postulate
4. If $EF + GH = 14$ and $GH = 8$, then $EF + 8 = 14$. Substitution Prop.
5. If $\overline{MN} \cong \overline{PQ}$, then $\overline{PQ} \cong \overline{MN}$. Symmetric Prop.
6. If $m\angle 7 + m\angle 8 = 85^\circ$ and $m\angle 8 = 41^\circ$, then $m\angle 7 + 41^\circ = 85^\circ$. Substitution
7. If R is the midpoint of \overline{QT} , then $\overline{QR} \cong \overline{RT}$. Midpoint Theorem
8. If $m\angle 1 = m\angle 2$, then $m\angle 1 + 30 = m\angle 2 + 30$. Addition Prop.
9. If $m\angle 1 = 23$ and $m\angle 2 = m\angle 1$, then $m\angle 2 = 23$. Substitution
10. If B is between C and D , then $CB + BD = CD$. Definition of Midpoint
11. If $m\angle 1 + m\angle 2 = 110$ and $m\angle 2 = m\angle 3$, then $m\angle 1 + m\angle 3 = 110$. Substitution
12. If $RS = ST$, then $RS + VW = ST + VW$. Addition Property
13. If \overline{JL} bisects $\angle AJC$, then $\angle AJL \cong \angle CJL$. Definition of Angle Bisector
14. If $m\angle 4 = m\angle 5$ and $m\angle 5 = m\angle 6$, then $m\angle 4 = m\angle 6$. Transitive
15. If $100 = m\angle B$, then $m\angle B = 100$. Symmetric
16. If X is the midpoint of \overline{BC} , then $\overline{BX} \cong \overline{CX}$. Midpoint Theorem
17. $7(x + 3) = 7x + 21$ Distributive Property
18. If two angles form a linear pair, then the sum of those two angles will be 180 degrees.
Supplementary
19. If B is in the interior of $\angle ACD$, then $m\angle ACB + m\angle BCD = m\angle ACD$. Angle Addition Postulate
20. If two angles form a right angle, then the sum of their angles will be 90 degrees.
Complementary

21. **Given:** $AC = MN$

Prove: $AB + BC = MN$

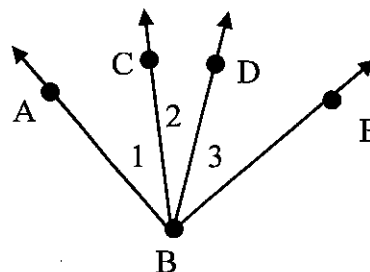


Statements	Reasons
$AC = MN$	Given
$AC = AB + BC$	Segment Addition Postulate
$MN = AB + BC$	Substitution
$AB + BC = MN$	Symmetric

22. Complete the proof below:

Given: $m\angle 1 = m\angle 3$

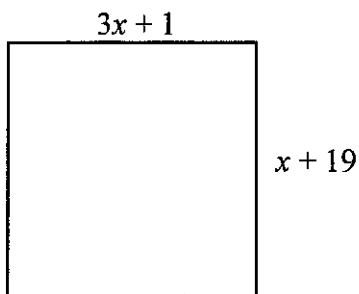
Prove: $m\angle ABD = m\angle CBE$



Statements	Reasons
1. $m\angle 1 = m\angle 3$	1. Given
2. $m\angle 1 + m\angle 2 = m\angle ABD$	2. Angle Add. Postulate
3. $m\angle 3 + m\angle 2 = m\angle ABD$	3. Substitution
4. $m\angle 3 + m\angle 2 = m\angle CBE$	4. Angle Add. Postulate
5. $m\angle ABD = m\angle CBE$	5. Transitive

Review:

23. Find the perimeter of the square.



$P = 112$ units