Geometry **Name** Answer Key

Review and Study Guide: 2.5 - 2.7 **Date** _____ **Period** ____

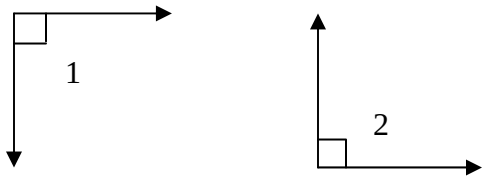
In 1 - 20, name the property, postulate or definition that justifies each step taken.

1. $\overline{RS} \cong \overline{XY}$; thus $\overline{XY} \cong \overline{RS}$ — **Symmetric Property**
2. $AB = RS$; thus $2AB = 2RS$ — **Multiplication Property**
3. $m\angle P + m\angle Q = m\angle R + m\angle Q$; thus $m\angle P = m\angle R$ — **Subtraction Property**
4. $\angle P \cong \angle Q$ and $\angle Q \cong \angle R$; thus $\angle P \cong \angle R$ — **Transitive Property**
5. $m\angle 1 + m\angle 4 = 90^\circ$ and $m\angle 4 = m\angle 6$; thus $m\angle 1 + m\angle 6 = 90^\circ$ — **Substitution Property**
6. $\overline{RS} \cong \overline{XY}$; thus $RS = XY$ — **Definition of Segment Congruence**
7. RS; thus $RS = RS$ — **Reflexive Property**
8. B is between A and C; thus $AB + BC = AC$ — **Segment Addition Postulate**
9. $\angle A$ and $\angle B$ are supplementary angles; thus $m\angle A + m\angle B = 180^\circ$ — **Definition of Supplementary Angles**
10. $\angle ABC \cong \angle CBD$; thus $\overrightarrow{BC}$ bisects $\angle ABD$ — **Definition of Angle Bisector**
11. $m\angle XYZ = m\angle PQR$; thus $\angle XYZ \cong \angle PQR$ — **Definition of Angle Congruence**
12. J bisects $\overline{RS}$; thus $\overline{RJ} \cong \overline{JS}$ — **Definition of Segment Bisector**
13. J is the midpoint of $\overline{RS}$; thus $\overline{RJ} \cong \overline{JS}$ — **Definition of Midpoint**
14. $m\angle T = 90^\circ$; thus $\angle T$ is a right angle — **Definition of Right Angle**
15. $\angle QRE$ is a straight angle; thus $m\angle QRE = 180^\circ$ — **Definition of Straight Angle**
16. $m\angle 1 + m\angle 2 = 90^\circ$; thus $\angle 1$ and $\angle 2$ are complementary angles — **Definition of Complementary Angles**
17. $m\angle 5 - 30^\circ = 60^\circ$; thus $m\angle 5 = 90^\circ$ — **Addition Property**
18. K is in the interior of $\angle CAT$; thus $m\angle CAK + m\angle KAT = m\angle CAT$ — **Angle Addition Postulate**
19. Lines ℓ and m intersect to form a right angle; thus $\ell \perp m$ — **Definition of Perpendicular Lines**
20. $2m\angle A = 180^\circ$; thus $m\angle A = 90^\circ$ — **Division Property**

In 21 – 24, complete each proof of the given theorem. Once these proofs are complete, we can use these theorems as reasons in future proofs.

21. All right angles are congruent.

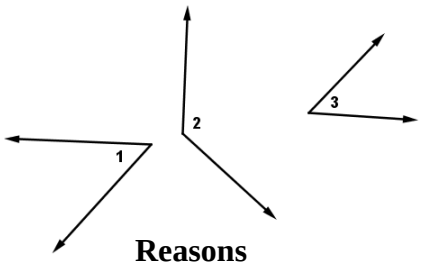
Given: **∠1 and ∠2 are right angles**
Prove: **∠1 ≅ ∠2**



Statements	Reasons
1. ∠1 and ∠2 are right angles	1. **Given**
2. $m\angle 1 = 90^\circ$	2. **Definition of Right Angle**
3. $m\angle 2 = 90^\circ$	3. **Definition of Right Angle**
4. $m\angle 1 = m\angle 2$	4. **Transitive**
5. ∠1 ≅ ∠2	5. **Definition of Congruence**

22. If two angles are supplementary to the same angle (or to congruent angles), then they are congruent.

Given: ∠1 and ∠2 are supplements
∠3 and ∠2 are supplements
Prove: **∠1 ≅ ∠3**

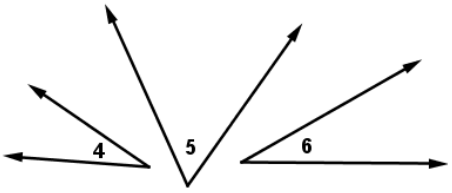


Statements	Reasons
1. ∠1 and ∠2 are supplements	1. **Given**
2. $m\angle 1 + m\angle 2 = 180°$	2. **Definition of Supplementary Angles**
3. ∠3 and ∠2 are supplements	3. **Given**
4. $m\angle 3 + m\angle 2 = 180°$	4. **Definition of Supplementary Angles**
5. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	5. **Transitive**
6. $m\angle 1 = m\angle 3$	6. **Subtraction**
7. ∠1 ≅ ∠3	7. **Definition of Congruence**

23. If two angles are complementary to the same angle (or to congruent angles), then they are congruent.

Given: ∠4 and ∠5 are complements
∠6 and ∠5 are complements

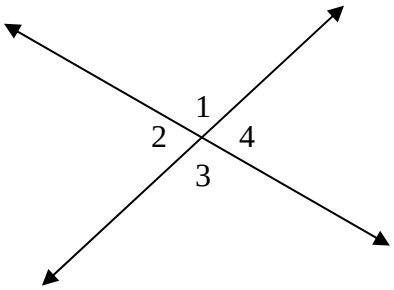
Prove: **∠4 ≅ ∠6**



Statements	Reasons
1. ∠4 and ∠6 are complements	1. Given
2. $m\angle 4 + m\angle 5 = 180°$	2. Definition of complementary angles
3. ∠6 and ∠5 are complements	3. **Given**
4. $m\angle 6 + m\angle 5 = 90°$	4. **Definition of complementary angles**
5. $m\angle 4 + m\angle 5 = m\angle 6 + m\angle 5$	5. Transitive Property
6. $m\angle 4 = m\angle 6$	6. **Subtraction**
7. ∠4 ≅ ∠6	7. Definition of congruence

24. Vertical angles are congruent.

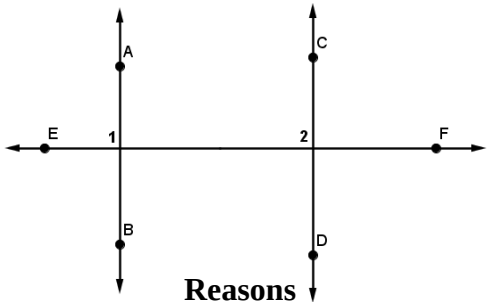
Given: $\angle 2$ **and** $\angle 4$ **are vertical angles**
Prove: $\angle 2 \cong \angle 4$



Statements	Reasons
1. $\angle 2$ **and** $\angle 4$ **are vertical angles**	1. Given
2. $\angle 2$ and $\angle 3$ are a linear pair	2. **Definition of Linear Pair**
3. $\angle 3$ and $\angle 4$ are a linear pair	3. **Definition of Linear Pair**
4. $\angle 2$ and $\angle 3$ are supplementary	4. **Linear pairs are supplementary**
5. $\angle 3$ **and** $\angle 4$ **are supplementary**	5. Linear pairs are supplementary
6. $\angle 2 \cong \angle 4$	6. If two angles are supplementary to the same angle, then they are congruent.

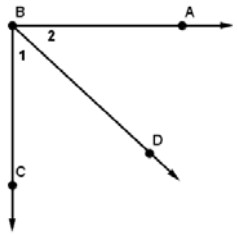
In 25 - 30 , complete each proof. REMEMBER TO LABEL YOUR PICTURE WITH THE GIVEN INFORMATION!

25. Given: $\overleftrightarrow{AB} \perp \overleftrightarrow{EF}$
$\overleftrightarrow{CD} \perp \overleftrightarrow{EF}$
Prove: $m\angle 1 = m\angle 2$



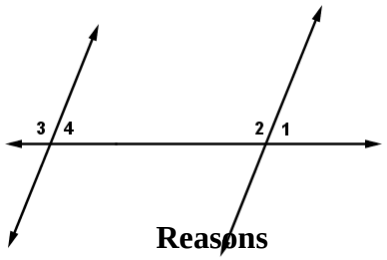
Statements	Reasons
1. $\overleftrightarrow{AB} \perp \overleftrightarrow{EF}$	1. **Given**
2. $\angle 1$ **is a right angle**	2. Definition of perpendicular lines
3. $\overleftrightarrow{CD} \perp \overleftrightarrow{EF}$	3. **Given**
4. $\angle 2$ **is a right angle**	4.**Definition of perpendicular lines**
5. $\angle 1 \cong \angle 2$	5. **All right angles are congruent**
6. $m\angle 1 = m\angle 2$	6. Definition of congruence

26. Given: $\angle 1$ and $\angle 2$ are complementary
$\overrightarrow{BD}$ bisects $\angle ABC$
Prove: $m\angle 2 = 45°$



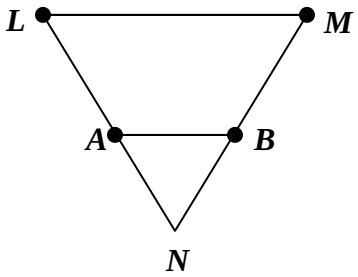
Statements	Reasons
1. $\angle 1$ and $\angle 2$ are complementary	1. **Given**
2. $m\angle 1 + m\angle 2 = 90°$	2. Definition of complementary angles
3. $\overrightarrow{BD}$ bisects $\angle ABC$	3. **Given**
4. $\angle 1 \cong \angle 2$	4. Definition of angle bisector
5. $m\angle 1 = m\angle 2$	5. **Definition of congruence**
6. $m\angle 2 + m\angle 2 = 90°$	6. **Substitution**
7. $2(m\angle 2) = 90°$	7. Simplify
8. $m\angle 2 = 45°$	8. Division

27. Given: $\angle 1$ and $\angle 2$ are a linear pair
$\angle 3$ and $\angle 4$ are a linear pair
$\angle 1$ and $\angle 3$ are supplementary
Prove: $\angle 2$ and $\angle 4$ are supplementary



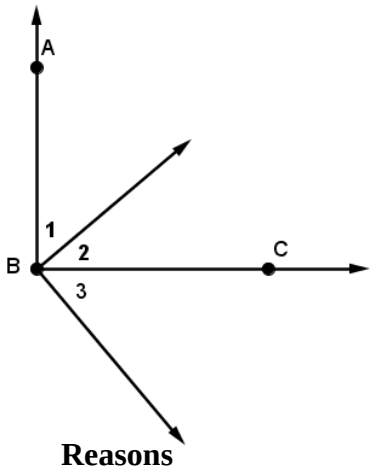
Statements	Reasons
1. $\angle 1$ and $\angle 2$ are a linear pair	1. **Given**
2. $\angle 1$ and $\angle 2$ are supplementary	2. **Linear pairs are supplementary**
3. $m\angle 1 + m\angle 2 = 180°$	3. **Definition of supplementary angles**
4. $\angle 1$ and $\angle 3$ are supplementary	4. **Given**
5. **$m\angle 1 + m\angle 3 = 180°$**	5. Definition of supplementary angles
6. $m\angle 1 + m\angle 2 = m\angle 1 + m\angle 3$	6. **Transitive**
7. **$m\angle 2 = m\angle 3$**	7. Subtraction
8. $\angle 3$ and $\angle 4$ are a linear pair	8. **Given**
9. **$\angle 3$ and $\angle 4$ are supplementary**	9. Linear pairs are supplementary
10. $m\angle 3 + m\angle 4 = 180°$	10. **Definition of supplementary angles**
11. $m\angle 2 + m\angle 4 = 180°$	11. **Substitution**
12. **$\angle 2$ and $\angle 4$ are supplementary**	12. Definition of supplementary angles

28. Given: $NL = NM$
$AL = BM$
Prove: $NA = NB$



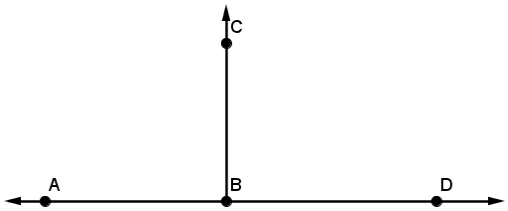
Statements	Reasons
1. ***NL = NM***	1. **Given**
2. $NL = NA + AL$	2. **Segment Addition Postulate**
3. ***NM = NB + BM***	3. Segment Addition Postulate
4. $NA + AL = NB + BM$	4. **Substitution**
5. ***AL = BM***	5. Given
6. $NA + AL = NB + AL$	6. **Substitution**
7. ***NA = NB***	7. **Subtraction**

29. Given: $\overline{AB} \perp \overline{BC}$
$m\angle 2 = m\angle 3$
Prove: $\angle 1$ and $\angle 3$ are complementary angles



Statements	Reasons
1. $\overline{AB} \perp \overline{BC}$	1. **Given**
2. **$\angle ABC$ is a right angle**	2. Definition of perpendicular lines
3. $m\angle ABC = 90°$	3. **Definition of right angle**
4. $m\angle ABC = m\angle 1 + m\angle 2$	4. **Angle Addition Postulate**
5. $m\angle 1 + m\angle 2 = 90°$	5. **Transitive**
6. $m\angle 2 = m\angle 3$	6. Given
7. $m\angle 1 + m\angle 3 = 90°$	7. **Substitution**
8. **$\angle 1$ and $\angle 3$ are complementary angles**	8. Definition of complementary angles

30. Given: $\angle ABC$ and $\angle DBC$ are a linear pair
$\angle ABC \cong \angle DBC$
Prove: $\angle ABC$ is a right angle



Statements	Reasons
1. **$\angle ABC$ and $\angle DBC$ are a linear pair**	1. Given
2. **$\angle ABC$ and $\angle DBC$ are supplementary**	2. Linear pairs are supplementary
3. $m\angle ABC + m\angle DBC = 180°$	3. **Definition of supplementary**
4. **$\angle ABC \cong \angle DBC$**	4. Given
5. **$m\angle ABC = m\angle DBC$**	5. Definition of congruence
6. **$m\angle ABC + m\angle ABC = 180°$**	6. Substitution
7. **$2(m\angle ABC) = 180°$**	7. Simplify
8. $m\angle ABC = 90°$	8. **Division**
9. **$\angle ABC$ is a right angle**	9. **Definition of Right Angle**