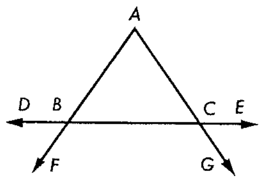
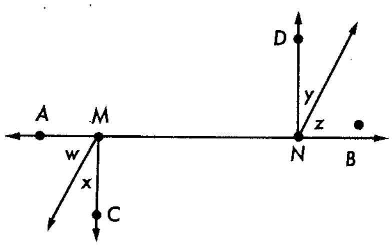
16. Copy and supply a proof.
Given: The figure with $\angle ABC \cong \angle ACB$.
Prove: $\angle DBF \cong \angle ECG$.



17. Copy and supply a proof.
Given the figure with $\overrightarrow{MC} \perp \overrightarrow{AB}$, $\overrightarrow{ND} \perp \overrightarrow{AB}$, and $\angle x \cong \angle y$.
Prove that $\angle w \cong \angle z$.



18. $\overleftrightarrow{CD}$ and $\overleftrightarrow{EF}$ intersect $\overleftrightarrow{AB}$ at points P and Q, respectively, such that $A–P–Q$, $P–Q–B$, $C–P–D$, and $E–Q–F$. C and E are on the same side of $\overleftrightarrow{AB}$. If $\angle CPQ \cong \angle PQF$, prove that $\angle APD \cong \angle BQE$. (Here you must draw your own figure, write out the "given" and "to prove," and supply a full proof.)

CHAPTER REVIEW

In items 1 through 15, complete each of the statements given.

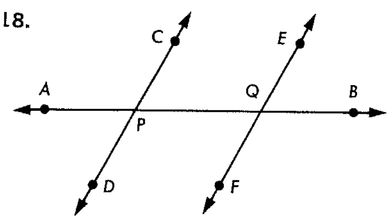
1. To every angle there corresponds a real number between 0 and 180, called the measure of the angle.
2. The instrument used to measure angles is a protractor
3. If the sum of the measures of two angles is 90, then each angle is a Complement of the other.
4. An angle with measure less than 90 is called acute.
5. An angle with measure greater than 90 is called obtuse.
6. Two angles formed by the union of two opposite rays and a third ray having the same end point are called a linear pair
7. Angles whose measures are equal are called congruent angles.
8. Two angles which are complementary must each be acute.

Answers to Problems

16. 1. $\angle ABC \cong \angle ACB$ (Given)
2. $\angle ABC$ and $\angle DBF$ form vertical angles.
$\angle ACB$ and $\angle ECG$ form vertical angles.
(Definition of vertical angles)
3. $\angle ABC \cong \angle DBF$.
$\angle ACB \cong \angle ECG$. (Vertical angles are congruent.)
4. $\angle DBF \cong \angle ECG$. (Transitive Property of Congruence)

17. 1. $\overrightarrow{MC} \perp \overrightarrow{AB}$; $\overrightarrow{ND} \perp \overrightarrow{AB}$ (Given)
2. $\angle AMC$ is a right angle;
$\angle BND$ is a right angle.
(Perpendiculars form right angles.)
3. $m\angle AMC = 90$; $m\angle BND = 90$.
(Definition of right angle.)
4. $m\angle w + m\angle x = m\angle AMC$.
$m\angle z + m\angle y = m\angle BND$. (AAP)
5. $\therefore m\angle w + m\angle x = 90$.
$m\angle z + m\angle y = 90$. (Transitivity)
6. $\angle w$ is complementary to $\angle x$; $\angle z$ is complementary to $\angle y$.
(Definition of complementary.)
7. $\angle x \cong \angle y$ (Given)
8. $\therefore \angle w \cong \angle z$ (Complement Theorem)

18.



Given: The figure with $\angle CPQ \cong \angle FQP$.

Prove: $\angle APD \cong \angle BQE$.

Proof
1. $\angle APD \cong \angle CPQ$ (Vertical Angle Theorem)
2. $\angle CPQ \cong \angle FQP$ (Given)
3. $\angle FQP \cong \angle BQE$ (Vertical Angle Theorem)
4. $\therefore \angle APD \cong \angle BQE$ (Transitive Property)

9. If two angles are congruent, their supplements are congruent.

10. Two angles which are both congruent and supplementary must each be right angles.

11. Every triangle has three sides and three angles; a triangle contains its sides, but does not contain its angles.

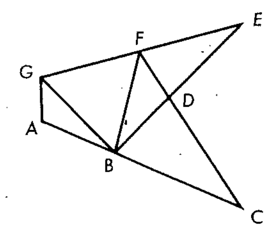
12. The sum of the measures of two complementary angles is 90, and the sum of the measures of two supplementary angles is 180.

13. The sum of the measures of two acute angles is always less than 180, and the sum of the measures of two obtuse angles is always less than 360.

14. If the sides of two angles are opposite rays, the angles are called vertical angles.

15. A point M is in the interior of $\angle GHK$ if M and G lie on the same side of $\overleftrightarrow{HK}$ and if M and K lie on the same side of $\overleftrightarrow{GH}$.

Items 16 through 25 refer to the figure below. (Points that look collinear are meant to be collinear.)



16. How many triangles are in this figure? 8

17. Is $m\angle BFC = m\angle BFD$? Yes

18. Is $\angle BFC = \angle BFD$? Yes

19. Is $\angle FDB \cong \angle EDC$? Yes

20. Name the angle supplementary to $\angle ABF$. $\angle FBC$

21. $m\angle AGB + m\angle BGF =$ $m\angle AGF$.

22. $m\angle GFC + m\angle DFE =$ 180.

23. Name a set of vertical angles. $\angle FDE$ and $\angle BDC$, $\angle FDB$ and $\angle EDC$

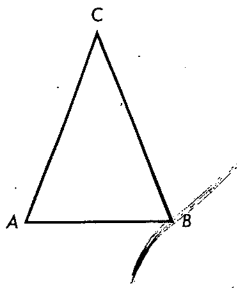
24. If $\angle GBF$ is complementary to $\angle FBE$, then $\overline{GB}$ and $\overline{BE}$ must be Perpendicular.

25. How many angles are indicated in the figure? 24

26. Name the three properties of an equivalence relation.
Reflexive, Symmetric, Transitive

27. If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$. This is an example of the transitive property of congruence.

28. For $\triangle ABC$, $\angle ACB \cong \angle BCA$. Which property of congruence is a reason for this statement? Reflexive

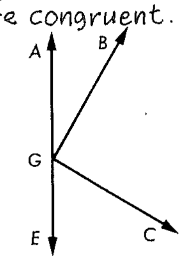


29. For $\triangle ABC$, if $\angle A \cong \angle B$, then $\angle B \cong \angle A$. This is an illustration of which property of congruence? Symmetric

30. The fact that congruence between angles is an equivalence relation is proved by using the fact that equality between real numbers is an equivalence relation.

31. State the theorem which is the basis for proving the Vertical Angle Theorem. Supplements of congruent angles are congruent.

32. Given the figure with $\overrightarrow{GA}$ opposite to $\overrightarrow{GE}$ and $\overrightarrow{GB} \perp \overrightarrow{GC}$, complete the proof that $\angle AGB$ is complementary to $\angle EGC$.



Proof

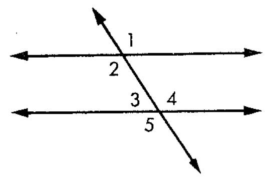
STATEMENTS	REASONS
1. $\overrightarrow{GA}$ is opposite to $\overrightarrow{GE}$.	1. Given
2. $\angle AGB$ is supplementary to $\angle BGE$.	2. Supplement Postulate
3. $m\angle AGB + m\angle BGE = 180$.	3. Def. of supp. angles
4. $\overrightarrow{GB} \perp \overrightarrow{GC}$.	4. Given
5. $m\angle BGC = 90$.	5. Definitions of perpendicular and right angle
6. $m\angle BGE = m\angle EGC + 90$.	6. Angle Addition Postulate
7. $m\angle AGB + m\angle EGC + 90 = 180$.	7. Additive, Transitive and Symmetric Properties of Equality
8. $m\angle AGB + m\angle EGC = 90$.	8. Subtra. Prop. of Equality
9. $\angle AGB$ is complementary to $\angle EGC$.	9. Def. of complementary angles

OR Substitution #6 into #3.

33. Is the following a correct restatement of the Angle Construction Postulate? No

Given a ray $\overrightarrow{RS}$ and a number k between 0 and 180, there is exactly one ray $\overrightarrow{RP}$ such that $m\angle SRP = k$.

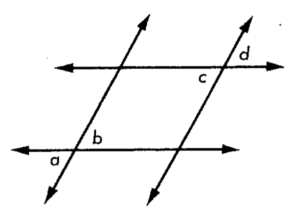
34. Given the figure with $\angle 2$ and $\angle 3$ supplementary, prove that $\angle 1 \cong \angle 4$.



Proof

STATEMENTS	REASONS
1. $\angle 1 \cong \angle 2$.	1. Vertical Angle Theorem
2. $\angle 2$ is supp. to $\angle 3$.	2. Given
3. $\angle 4$ is supp. to $\angle 3$.	3. Supplement Postulate
4. $\angle 2 \cong \angle 4$.	4. Supplement Theorem
5. $\therefore$ $\angle 1 \cong \angle 4$.	5. Transitivity

35. If, in the figure, $\angle b \cong \angle c$, prove that $\angle a \cong \angle d$.



Proof

STATEMENTS	REASONS
1. $\angle a \cong \angle b$.	1. Vertical Angle Theorem
2. $\angle b \cong \angle c$.	2. Given
3. $\angle c \cong \angle d$.	3. Vertical Angle Theorem
4. $\therefore$ $\angle a \cong \angle d$.	4. Transitivity

a = b
b = c
a = c
c = d
a = d