Chapter 1
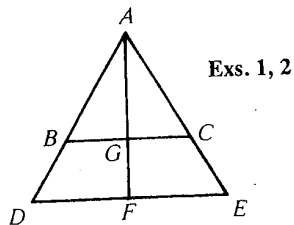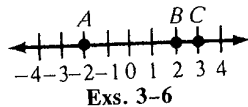
1. Name three collinear points.
2. Name three coplanar points that are noncollinear.
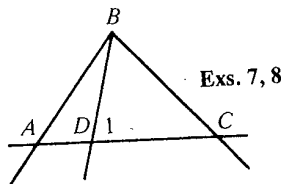
3. Name the coordinate of point A.
4. Name the coordinate of the midpoint of $\overline{AC}$.
5. Complete: $AB + BC = \underline{\ ?\ }$
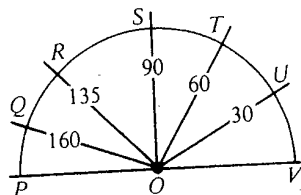6. Name a ray opposite to $\overrightarrow{BC}$.

7. Name a pair of adjacent angles.
8. Name the sides of $\angle 1$.

9. Name the vertex of $\angle ROS$.
10. Name a right angle.
11. Name the postulate that justifies the following statement:
$$m\angle ROS + m\angle SOU = m\angle ROU.$$
12. Find the measure of $\angle SOU$.

Complete.

13. If $\overrightarrow{BD}$ bisects $\angle ABC$, then $\underline{\ ?\ } = \underline{\ ?\ }$.
14. If $\overrightarrow{BD}$ bisects $\angle ABC$ and $m\angle 1 = 45$, then $m\angle 2 = \underline{\ ?\ }$.
15. If $\overrightarrow{BD}$ bisects $\angle ABC$, $m\angle 1 = 4x + 8$, and $m\angle 2 = 7x - 1$, then $x = \underline{\ ?\ }$.

Classify each statement as true or false.

16. Any three points lie in exactly one plane.
17. A line and a point not on that line lie in more than one plane.
18. The intersection of two lines is exactly one point.
19. The intersection of two planes is exactly one point.
20. The length of $\overline{AB}$ is denoted by AB.
21. If an angle appears to be a 90° angle, then you can conclude it is a right angle.
22. If a point C is between points A and B, then C must lie on $\overrightarrow{AB}$.

Exs. 1, 2

Exs. 3–6

Exs. 7, 8

Exs. 9–12
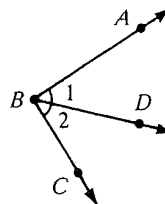
Exs. 13–15

Chapter 2

1. Write the hypothesis and the conclusion of the conditional statement:

   If $\angle A$ is a right angle, then $m\angle A = 90$.

2. Write the converse of the following statement:

   If $x < 0$, then $x^2 > 0$.

3. Justify each statement with a property from algebra.

   a. If $2x = 7$, then $7 = 2x$.

   b. If $-3y + x = 12$ and $x = 2y$, then $-3y + 2y = 12$.

4. $\overrightarrow{YK}$ is the bisector of $\angle XYZ$, $\overrightarrow{YD}$ is the bisector of $\angle KYZ$, and $m\angle XYZ = 144$. Find $m\angle KYD$.

5. Name a pair of complementary angles.

6. Name two perpendicular rays.

7. Name a pair of adjacent supplementary angles.

8. $\overrightarrow{PE}$ bisects $\angle DPC$. Find $m\angle EPC$.

9. Complete: $m\angle APD + m\angle BPC = \underline{\quad?\quad}$

10. Name a pair of vertical angles.
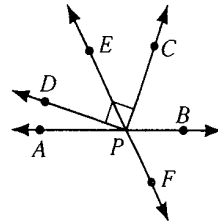
Exs. 5–10

Complete.

11. If M is the midpoint of $\overline{PL}$, then $PM = \underline{\quad?\quad}$.

12. If $\angle A$ and $\angle B$ are complementary and $m\angle A = 47$, then $m\angle B = \underline{\quad?\quad}$.

13. If $\angle 1$ and $\angle 2$ are vertical angles, then $\angle 1 \underline{\quad?\quad} \angle 2$.

14. If two lines form congruent adjacent angles, then the lines are $\underline{\quad?\quad}$.

15. Supplements of congruent angles are $\underline{\quad?\quad}$.

Classify each statement as true or false.

16. Perpendicular lines form right angles.

17. Adjacent angles must be complementary.

18. Two segments are congruent if and only if their lengths are equal.

19. Theorems that have already been proved can be used as reasons in proofs.

Write a proof in two-column form.

20. Given: $\overline{AB} \perp \overline{BC}$;

    $\angle 1$ and $\angle 2$ are complementary angles.

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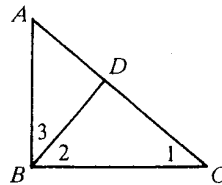
Chapter 3

Complete each statement with the word *always*, *sometimes*, or *never*.

1. Two lines that do not intersect are __?__ parallel.
2. Two lines parallel to the same plane __?__ intersect.
3. Through a point not on a line, one can __?__ draw a line parallel to the line.
4. An acute triangle is __?__ a right triangle.
5. Two lines parallel to a third line are __?__ parallel to each other.
6. If two lines are cut by a transversal, then corresponding angles are __?__ congruent.
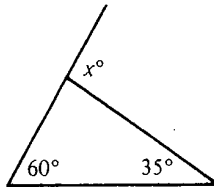7. Two lines perpendicular to the same line are __?__ parallel.

Find the measures of the numbered angles in the diagrams shown.

8.

9.
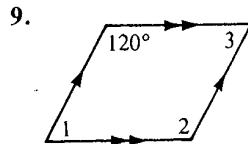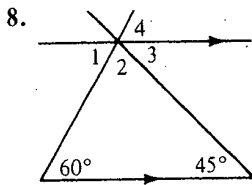
10. Explain why $\overleftrightarrow{AC}$ and $\overleftrightarrow{DE}$ must be parallel.
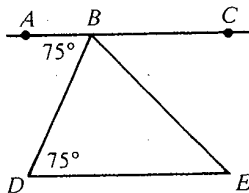
11. Find the value of x.

12. A polygon has 7 sides. Find the sum of the measures of the interior angles.
13. A regular polygon has 15 sides. Find the measure of each exterior angle.
14. Use inductive reasoning to predict the next two numbers in each sequence.
    a. 1, 6, 10, 13, . . .   b. $\frac{1}{4}$, 1, 4, 16, . . .

Write a proof in two-column form.

15. Given: $\overline{BC} \parallel \overline{DE}$; $\angle D \cong \angle B$
    Prove: $\overline{AB} \parallel \overline{CD}$
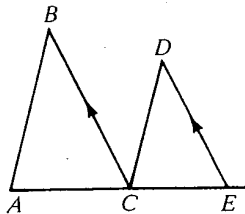
Chapter 4

Complete.

1. If $\triangle TAR \cong \triangle DEW$, then $\angle A \cong$ __?__, $\overline{RT} \cong$ __?__, and $\triangle ART \cong$ __?__.
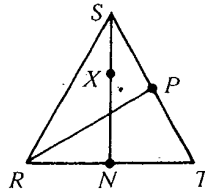
2. If $\overline{PA} \cong \overline{AT}$, then $\triangle PAT$ is a(n) __?__ triangle.

3. If $\overline{SP} \cong \overline{PT}$, then $\overline{RP}$ is a(n) __?__ of $\triangle RST$.

4. If $m \angle RPS = 90$, then $\overline{RP}$ is a(n) __?__ of $\triangle RST$.

5. If X is equidistant from the sides of $\angle RST$, then $\overrightarrow{SX}$ is the __?__ of $\angle$ __?__.

Exs. 3–6

6. If $\overline{SN}$ is a perpendicular bisector of $\overline{RT}$, then X is equidistant from __?__ and __?__.

7. If $m \angle 1 = 50$, find the measures of $\angle 2$ and $\angle 3$.
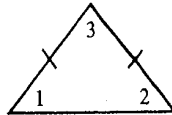
Can the triangles be proved congruent? If so, by which method, SSS, SAS, ASA, AAS, or HL?

8.

9.

10.

11.

12.

13.
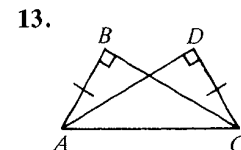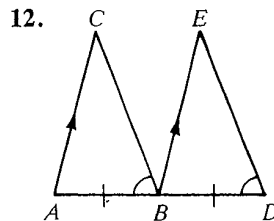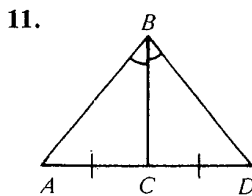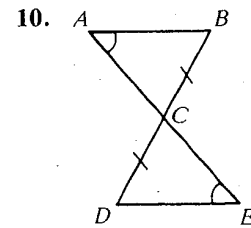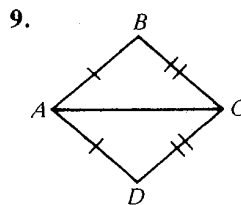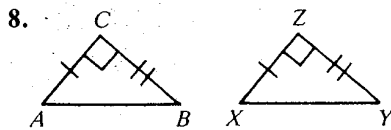
14. Given: H is the midpoint of $\overline{DK}$ and $\overline{PG}$.
Prove: $\overline{DG} \cong \overline{KP}$
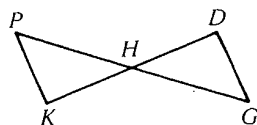
15. Given: $\overline{CS}$ and $\overline{AT}$ are altitudes;
$\overline{CS} \cong \overline{AT}$
Prove: $\overline{AS} \cong \overline{CT}$
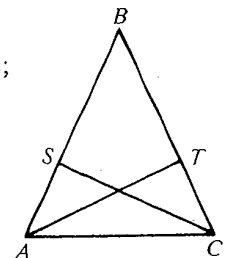
Chapter 5

Complete each statement with the word *always, sometimes,* or *never.*

1. A rectangle is __?__ a square.
2. The diagonals of a square are __?__ perpendicular.
3. A rhombus is __?__ equiangular.
4. If $\overline{AD} \parallel \overline{BC}$ and $\overline{AB} \cong \overline{CD}$, then quadrilateral $ABCD$ is __?__ a parallelogram.
5. A trapezoid __?__ has congruent bases.

Quadrilateral *ABCD* is a parallelogram. Complete.

6. If $DC = 8$ and $AD = 6$, then
   $AB = $ __?__ and $BC = $ __?__.
7. If $RC = 10$ and $DR = 7$, then
   $BD = $ __?__ and $AR = $ __?__.
8. If $m\angle CDA = 100$, then $m\angle ABC = $ __?__
   and $m\angle DAB = $ __?__.
9. If $m\angle 1 = 30$ and $m\angle 2 = 40$, then
   $m\angle 3 = $ __?__ and $m\angle 4 = $ __?__.
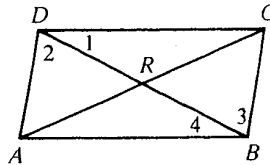
Ex s. 6–9

Trapezoid *TRAP* has median $\overline{MN}$.

10. If $m\angle T = 60$ and $m\angle A = 150$, then
    $m\angle P = $ __?__ and $m\angle R = $ __?__.
11. If $PM = 12$ and $NR = 15$, then
    $MT = $ __?__ and $AN = $ __?__.
12. If $PA = 3x - 6$, $MN = x + 5$, and
    $TR = 5x - 2$, then $x = $ __?__.
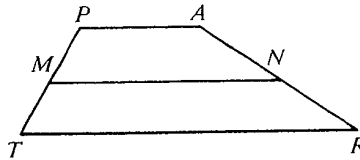
Exs. 10–12

Complete.

13. The segment that joins the midpoints of two sides of a triangle is __?__ to the third side and __?__ as long as the third side.
14. If two lines are parallel, then all points on one line are __?__ from the other line.

15. Given: $\square PQRS$; $\angle 1 \cong \angle 2$
    Prove: $\overline{ST} \cong \overline{QU}$

16. Given: $\square CDEF$; S and T are
    the midpoints of $\overline{EF}$ and $\overline{ED}$.
    Prove: $\overline{SR} \cong \overline{FD}$
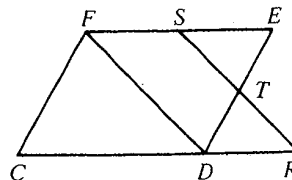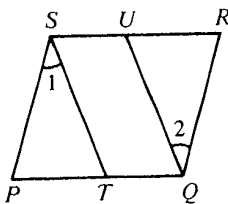
Chapter 6

Classify each statement as true or false.

1. $m \angle 1 = m \angle BAC + m \angle B$ 2. $m \angle B + m \angle C > m \angle 1$

3. $m \angle 1 < m \angle B$ 4. $m \angle 1 > m \angle C$
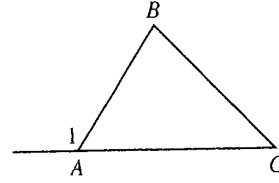
Consider the true statement: Two skew lines do not intersect.

5. Write the statement in if-then form.

6. Write the converse. Is the converse true or false?

7. Write the inverse. Is the inverse true or false?

8. Write the contrapositive. Is the contrapositive true or false?

Complete each sentence on how to write an indirect proof.

9. Assume temporarily that the conclusion is __?__.

10. Reason logically until you reach a contradiction of a __?__.

11. Point out that the temporary assumption must be __?__, and that the conclusion must then be __?__.

12. To write an indirect proof of "If x is an integer and x^2 is even, then x is even," you begin by writing: Assume temporarily that __?__.

Complete each statement by writing $<$, $=$, or $>$. In Exercises 13 and 15 the diagrams are not drawn to scale.

13. If $BC > AC$, then $m \angle B$ __?__ $m \angle A$.

14. $RS + ST$ __?__ RT
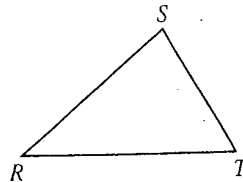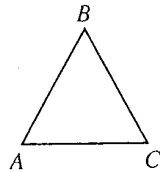
15. If $\overline{PQ} \cong \overline{RQ}$ and $PT > TR$, then $m \angle 1$ __?__ $m \angle 2$.

16. Use $m \angle 1$, $m \angle 2$, and $m \angle 3$ to complete: __?__ $>$ __?__ $>$ __?__
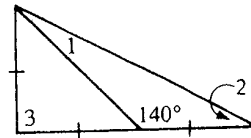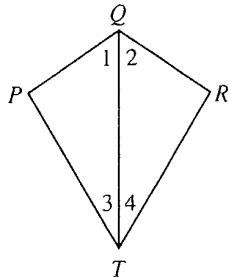
17. The lengths of two sides of a triangle are 16 and 10. The length of the third side must be greater than __?__, but less than __?__.

Chapter 7

1. Two sides of a rectangle have the lengths 20 and 32. Find, in simplest form, the ratio of:
   a. the length of the shorter side to the length of the longer side
   b. the perimeter to the length of the longer side

2. If quad. $ABCD \sim$ quad. $THUS$, then:
   a. $\angle U \cong$ __?__
   b. $\dfrac{BC}{HU} = \dfrac{AD}{?}$

3. If $x:y:z = 4:6:9$ and $z = 45$, then $x =$ __?__ and $y =$ __?__.

4. If $\dfrac{8}{9} = \dfrac{x}{15}$, then $x =$ __?__.

5. If $\dfrac{a}{b} = \dfrac{c}{10}$, then $\dfrac{a+b}{?} = \dfrac{?}{10}$.

6. What postulate or theorem justifies the statement
   $\triangle AVB \sim \triangle NVK$?

7. $\dfrac{AB}{NK} = \dfrac{VA}{?}$

8. $\angle VBA \cong$ __?__

9. The scale factor of $\triangle AVB$ to $\triangle NVK$ is $\dfrac{5}{8}$.
   If $VA = 2.5$ and $VB = 1.7$, then $VN =$ __?__.
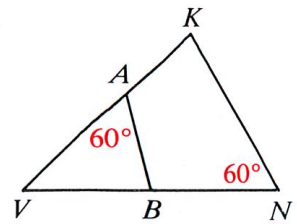
10. If $PR = 10$, $RS = 6$, and $PT = 15$, then $TU =$ __?__.
11. If $PT = 32$, $PU = 48$, and $RS = 10$, then $PR =$ __?__.
12. If $PR = 14$, $RS = 7$, and $RT = 26$, then $SU =$ __?__.
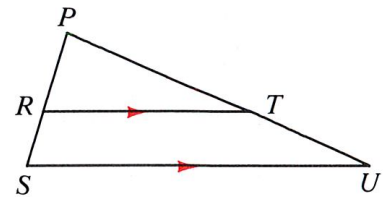
In $\triangle GEB$, the bisector of $\angle E$ meets $\overline{GB}$ at K.

13. If $GK = 5$, $KB = 8$, and $GE = 7$, then $EB =$ __?__.
14. If $GE = 14$, $EB = 21$, and $GB = 30$, then $GK =$ __?__.
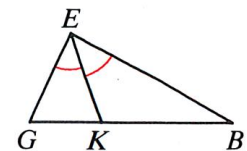
15. Given: $\overleftrightarrow{DE} \parallel \overleftrightarrow{FG} \parallel \overleftrightarrow{HJ}$
    Prove: $DF \cdot GJ = FH \cdot EG$
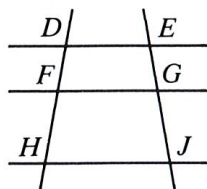
16. Given: $BX = 6$; $AX = 8$;
    $\quad\quad CX = 9$; $DX = 12$
    Prove: $\overline{AB} \parallel \overline{CD}$
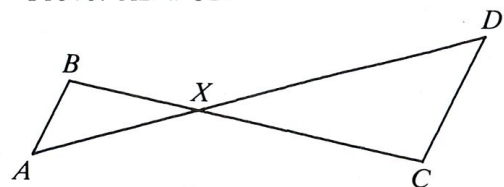
Examinations   Multiple Choice

Chapter 1

Indicate the best answer by writing the appropriate letter.

1. Which of the following sets of points are *not* coplanar?
   a. E, H, O, G **b.** K, O, G, E
   c. E, O, F, J **d.** H, K, O, J

2. Which of the following sets of points are contained in *more* than one plane?
   a. G, O, J **b.** E, O, G
   c. H, E, G **d.** G, O, H

3. How many planes contain point E and $\overleftrightarrow{JK}$?
   a. 0   **b.** exactly 1
   c. unlimited   **d.** unknown

4. If $\overleftrightarrow{GH}$ bisects $\overline{EF}$, which statement is *not necessarily* true?
   a. O is the midpoint of $\overline{GH}$.   **b.** $\overline{EO} \cong \overline{OF}$
   c. E, F, G, H, and O are coplanar.   **d.** $GO + OH = GH$
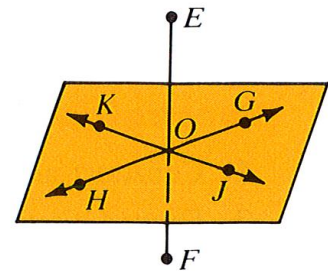
Exs. 1–4

5. Points A, B, C are collinear, but they do not necessarily lie on a line in the order named. If $AB = 5$ and $BC = 3$, what is the length of $\overline{AC}$?
   a. either 2 or 8   **b.** either 2 or 4   **c.** 2   **d.** 8

6. On a number line, point R has coordinate -5 and point S has coordinate 3. Point X lies on $\overrightarrow{SR}$ and $SX = 5$. Find the coordinate of X.
   a. -10 **b.** -2 **c.** 8   **d.** 0

7. Which angle appears to be obtuse?
   a. $\angle AEB$ **b.** $\angle DEB$
   c. $\angle CEA$ **d.** $\angle AED$

8. If $\overrightarrow{EC}$ bisects $\angle DEB$, $\overrightarrow{EB}$ bisects $\angle DEA$, and $m\angle BEC = 28$, find the measure of $\angle CEA$.
   a. 28   **b.** 56
   c. 84   **d.** 112
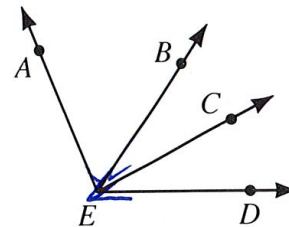
9. Which two angles are adjacent angles?
   a. $\angle DEB$ and $\angle BEA$ **b.** $\angle DEB$ and $\angle CEA$
   c. $\angle DEC$ and $\angle BEA$ **d.** $\angle DEA$ and $\angle DEC$

Exs. 7–9

10. M is the midpoint of $\overline{YZ}$. If $YM = r + 3$ and $YZ = 3r - 1$, find MZ.
    a. 7   **b.** 10   **c.** 20   **d.** 4

11. Which of the following is *not always* true when lines j and k intersect?
    a. Exactly one plane contains line j.
    b. The lines intersect in exactly one point.
    c. All points on j and k are coplanar points.
    d. Given any point P on j and any point Q on k, P and Q are collinear points.

Chapter 2

Indicate the best answer by writing the appropriate letter.

1. If $m\angle 1 = 60$ and $m\angle 2 = 30$, then $\angle 1$ and $\angle 2$ *cannot* be which of the following?
   a. acute $\angle\!s$
   b. adjacent $\angle\!s$
   c. vertical $\angle\!s$
   d. complementary $\angle\!s$

2. Given: If q, then r. Which of the following is the converse of the given conditional?
   a. r implies q.
   b. r if q.
   c. q only if r.
   d. r if and only if q.

3. What are basic mathematical assumptions called?
   a. theorems
   b. postulates
   c. conditionals
   d. conclusions

4. Which of the following *cannot* be used as a reason in a proof?
   a. a definition
   b. a postulate
   c. yesterday's theorem
   d. tomorrow's theorem

5. $\angle A$ and $\angle B$ are supplements, $m\angle A = 2x - 14$, and $m\angle B = x + 8$. Find the measure of $\angle B$.
   a. 62
   b. 30
   c. 40
   d. 70

6. If $\angle 1$ and $\angle 2$ are complements, $\angle 2$ and $\angle 3$ are complements, and $\angle 3$ and $\angle 4$ are supplements, what are $\angle 1$ and $\angle 4$?
   a. supplements
   b. complements
   c. congruent angles
   d. can't be determined

7. The statement "If $m\angle A = m\angle B$ and $m\angle D = m\angle A + m\angle C$, then $m\angle D = m\angle B + m\angle C$" is justified by what property?
   a. Transitive
   b. Substitution
   c. Symmetric
   d. Reflexive

8. If $\overline{TQ} \perp \overline{QR}$, which angles *must* be complementary angles?
   a. $\angle 2$ and $\angle 3$
   b. $\angle 3$ and $\angle 4$
   c. $\angle 5$ and $\angle 8$
   d. $\angle 3$ and $\angle 7$

9. If $m\angle 8 = x + 80$, what is the measure of $\angle 9$?
   a. $100 - x$
   b. $100 + x$
   c. $x - 80$
   d. $x - 180$

10. If $\overline{QT} \perp \overline{PS}$, which statement is *not* always true?
    a. $\angle 8 \cong \angle 9$
    b. $\angle 2 \cong \angle 3$
    c. $\angle 8$ is a rt. $\angle$.
    d. $\angle 8$ and $\angle 9$ are supp. $\angle\!s$.

11. If $\overrightarrow{SQ}$ bisects $\angle RST$, which statement *must* be true?
    a. $2 \cdot m\angle 6 = m\angle RST$
    b. $\frac{1}{2}m\angle 7 = m\angle RST$
    c. $\angle 4 \cong \angle 6$
   d. $\angle RST \cong \angle RQT$
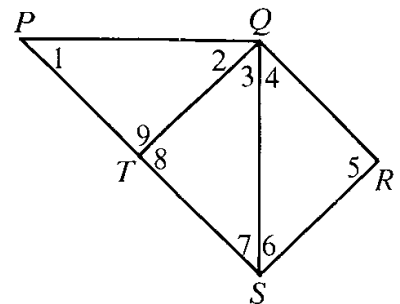
Exs. 8–11

Chapter 3

Indicate the best answer by writing the appropriate letter.

1. If $\overrightarrow{BE}$ bisects $\angle ABC$, what is the measure of $\angle AEB$?
   a. 30   **b.** 35   **c.** 40   **d.** 45

2. If $m\angle ABE = 40$, what is the measure of $\angle DEB$?
   a. 140   **b.** 40   **c.** 75   **d.** 135

3. If $\overline{AB} \parallel \overline{DC}$, what is the measure of $\angle D$?
   a. 70   **b.** 80   **c.** 90   **d.** 100

4. Which of the following would allow you to conclude that $\overline{AD} \parallel \overline{BC}$?
   a. $\angle DEC \cong \angle BCE$ **b.** $\angle ABE \cong \angle BEC$
   c. $\angle BEC \cong \angle BCE$ **d.** $m\angle A + m\angle AEC = 180$

Exs. 1–4

5. What is the measure of each interior angle of a regular octagon?
   a. 150   **b.** 144   **c.** 140   **d.** 135
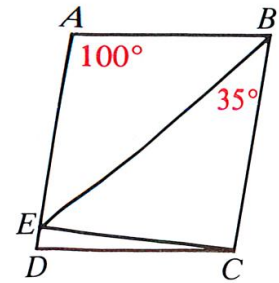
6. The plane containing Q, S, A, U appears to be parallel to the plane containing which points?
   a. Q, E, K, S **b.** E, K, C, R
   c. R, E, Q, U **d.** U, R, C, A

7. Which of the following appear to be skew lines?
   a. $\overleftrightarrow{QE}$ and $\overleftrightarrow{AC}$ **b.** $\overleftrightarrow{QU}$ and $\overleftrightarrow{KC}$
   c. $\overleftrightarrow{AC}$ and $\overleftrightarrow{UR}$ **d.** $\overleftrightarrow{QS}$ and $\overleftrightarrow{AC}$

Exs. 6–8

8. $\overleftrightarrow{EK}$ does *not* appear to be parallel to the plane containing which points?
   a. U, A, C **b.** Q, U, A **c.** Q, U, R **d.** Q, S, C

9. The sum of the measures of the interior angles of a certain polygon is the same as the sum of the measures of its exterior angles. How many sides does the polygon have?
   a. four   **b.** six   **c.** eight   **d.** ten

10. What is the next number in the sequence 1, 2, 4, 7, 11, . . . ?
    a. 17   **b.** 13   **c.** 16   **d.** 15

11. $\overline{AC}$ is a diagonal of regular pentagon $ABCDE$. What is the measure of $\angle ACD$?
    a. 36   **b.** 54   **c.** 72   **d.** 108

12. A, B, C, and D are coplanar points. $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, $\overleftrightarrow{AB} \perp \overleftrightarrow{AC}$, and $m\angle ACD = 2x + 8$. Find the value of x.
    a. 41   **b.** 49   **c.** 90   **d.** 180

13. What is the *principal* basis for inductive reasoning?
    a. definitions   **b.** previously proved theorems
    c. postulates   **d.** past observations
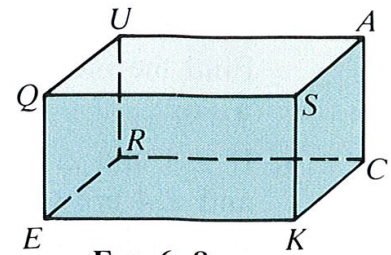
Chapter 4

In Exercises 1–8 write a method (SSS, SAS, ASA, AAS, or HL) that can be used to prove the two triangles congruent.

1.

2.

3.

4.

5.

6.
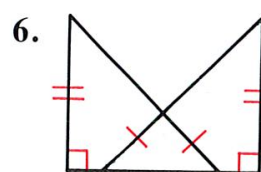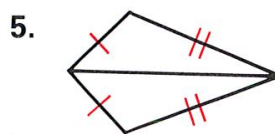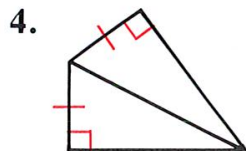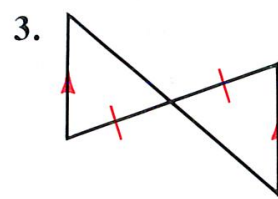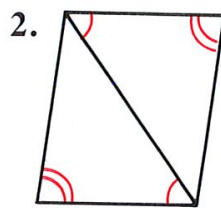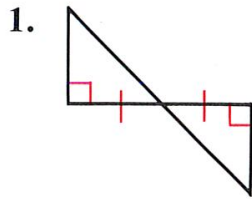
7. Given: $\overline{PO} \perp$ plane X; $OT = OS$
8. Given: $\overline{PO} \perp$ plane X; $PT = PS$
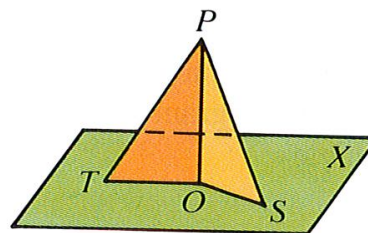
Exs. 7, 8

Indicate the best answer by writing the appropriate letter.

9. In $\triangle RXT$, $\angle R \cong \angle T$, $RT = 2x + 5$, $RX = 5x - 7$, and
   $TX = 2x + 8$. What is the perimeter of $\triangle RXT$?
   a. 5   **b.** 15   **c.** 18   **d.** 51

10. If $\triangle DEF \cong \triangle PRS$, which of these congruences *must* be true?
    a. $\overline{DF} \cong \overline{PS}$ **b.** $\overline{EF} \cong \overline{PR}$ **c.** $\angle E \cong \angle S$ **d.** $\angle F \cong \angle R$

11. In $\triangle ABC$, $AB = AC$, $m \angle A = 46$, and $\overline{BD}$ is an altitude. What is the
    measure of $\angle CBD$?
    a. 23   **b.** 44   **c.** 67   **d.** 134

12. An equiangular triangle *cannot* be which of the following?
    a. equilateral   **b.** isosceles   **c.** scalene   **d.** acute

13. Point X is equidistant from vertices T and N of scalene $\triangle TEN$. Point X
    must lie on which of the following?
    a. bisector of $\angle E$ **b.** perpendicular bisector of $\overline{TN}$
    c. median to $\overline{TN}$ **d.** the altitude to $\overline{TN}$

14. Given: $\overline{AB} \parallel \overline{DC}$; $\overline{AB} \cong \overline{CD}$; $\angle 1 \cong \angle 2$
    To prove that $\overline{DE} \cong \overline{BF}$, what would you prove first?
    a. $\triangle ADE \cong \triangle CBF$ **b.** $\triangle ABF \cong \triangle CDE$
    c. $\triangle ABC \cong \triangle CDA$ **d.** cannot be proved
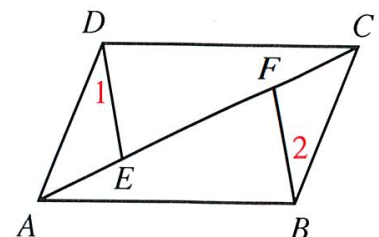
Chapter 5

Indicate the best answer by writing the appropriate letter.

1. Both pairs of opposite sides of a quadrilateral are parallel. Which special kind of quadrilateral *must* it be?
   - **a.** parallelogram
   - **b.** rectangle
   - **c.** rhombus
   - **d.** trapezoid

2. The diagonals of a certain quadrilateral are congruent. Which term could *not* be used to describe the quadrilateral?
   - **a.** isosceles trapezoid
   - **b.** rectangle
   - **c.** rhombus
   - **d.** parallelogram with a 60° angle

3. M is the midpoint of hypotenuse $\overline{TK}$ of right $\triangle TAK$. $AM = 13$. What is the length of $\overline{TK}$?
   - **a.** 26
   - **b.** $19\frac{1}{2}$
   - **c.** 13
   - **d.** none of these

4. In $\square\, WXYZ$, $WX = 10$. What does ZW equal?
   - **a.** 16
   - **b.** YZ
   - **c.** WY
   - **d.** none of these

5. A diagonal of a parallelogram bisects one of its angles. Which special kind of parallelogram *must* it be?
   - **a.** rectangle
   - **b.** rhombus
   - **c.** square
   - **d.** parallelogram with a 60° angle

6. The lengths of the bases of a trapezoid are 18 and 26. What is the length of the median?
   - **a.** 8
   - **b.** 22
   - **c.** 44
   - **d.** 34

7. In quad. $PQRS$, $PQ = SR$, $QR = PS$, and $m\angle P = m\angle Q$. Which of the following is *not necessarily* true?
   - **a.** $\overline{PR} \perp \overline{QS}$
   - **b.** $\overline{PR} \cong \overline{QS}$
   - **c.** $\angle P \cong \angle R$
   - **d.** $\angle R \cong \angle S$

8. In $\triangle ABC$, $AB = 8$, $BC = 10$, and $AC = 12$. M is the midpoint of $\overline{AB}$, and N is the midpoint of $\overline{BC}$. What is the length of $\overline{MN}$?
   - **a.** 4
   - **b.** 5
   - **c.** 6
   - **d.** 9

9. If $EFGH$ is a parallelogram, which of the following *must* be true?
   - **a.** $\angle E \cong \angle F$
   - **b.** $\angle F \cong \angle H$
   - **c.** $\overline{FG} \parallel \overline{GH}$
   - **d.** $m\angle E + m\angle G = 180$

10. Which information does *not* prove that quad. $ABCD$ is a parallelogram?
    - **a.** $\overline{AC}$ and $\overline{BD}$ bisect each other.
    - **b.** $\overline{AD} \parallel \overline{BC};\ \overline{AD} \cong \overline{BC}$
    - **c.** $\overline{AB} \parallel \overline{CD};\ \overline{AD} \cong \overline{BC}$
    - **d.** $\angle A \cong \angle C;\ \angle B \cong \angle D$

11. In the figure, $\overline{RU} \cong \overline{US}$ and $\angle 1 \cong \angle 2$. Which of the following *cannot* be proved?
    - **a.** $\angle 3 \cong \angle 4$
    - **b.** $\overline{RV} \cong \overline{VT}$
    - **c.** $\overline{US} \cong \overline{VT}$
    - **d.** $ST = 2 \cdot UV$

12. Which of the following *must* be true for any trapezoid?
    - **a.** Any two consecutive angles are supplementary.
    - **b.** At least one angle is obtuse.
    - **c.** The diagonals bisect each other.
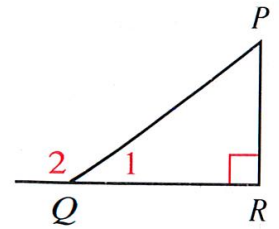   - **d.** The median bisects each base.
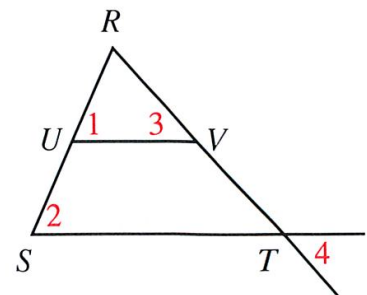
Ex. 11

Chapter 6

Indicate the best answer by writing the appropriate letter.

1. Which of the following statements *must* be false?
   a. $QR + PR > PQ$
   b. $m\angle 2 > m\angle P + m\angle R$
   c. $\frac{1}{2}m\angle 2 > \frac{1}{2}m\angle 1$
   d. $PQ > PR$

Ex. 1

2. You don't need a figure to do this exercise. Given that $m\angle A = m\angle B$, you want to prove that $m\angle 3 = m\angle 4$. To write an an indirect proof, you should begin by temporarily assuming which statement?
   a. $m\angle A \neq m\angle B$
   b. $m\angle A = m\angle B$
   c. $m\angle 3 = m\angle 4$
   d. $m\angle 3 \neq m\angle 4$

3. In quadrilateral $MNPQ$, $MN = 5$, $NP = 6$, $PQ = 7$, and $QM = 9$. Which of the following might possibly be the length of $\overline{NQ}$?
   a. 12.5
   b. 14
   c. 2
   d. all of these

4. Given: (1) If A is white, then B is red.
   (2) B is not red.
   Which of the following *must* be true?
   a. B is white.
   b. B is not white.
   c. A is not white.
   d. A is red.

5. If a conditional is known to be true, then which of the following *must* also be true?
   a. its converse
   b. its contrapositive
   c. its inverse
   d. none of these

6. In $\triangle DEF$, $m\angle D = 50$, and an exterior angle with vertex F has measure 120. What is the longest side of $\triangle DEF$?
   a. $\overline{DE}$
   b. $\overline{EF}$
   c. $\overline{DF}$
   d. unknown

7. In $\triangle MNP$, $MN = 8$ and $NP = 10$. Which of these *must* be true?
   a. $MP > 2$
   b. $MP < 2$
   c. $MP > 10$
   d. $MP < 10$

8. What is the inverse of "If $x = 3$, then $x > 0$"?
   a. If $x > 0$, then $x = 3$.
   b. If $x \neq 3$, then $x \leq 0$.
   c. If $x \leq 0$, then $x \neq 3$.
   d. If $x = 3$, then $x \leq 0$.

9. If $RT = ST$ and $RX > SX$, what can you conclude?
   a. $m\angle 1 > m\angle 2$
   b. $m\angle XRS > m\angle XSR$
   c. $m\angle 3 = m\angle 4$
   d. $m\angle 5 > m\angle 6$

10. If $RX = SX$ and $m\angle 5 > m\angle 6$, what can you conclude?
    a. $m\angle TRS < m\angle TSR$
    b. $RT < ST$
    c. $m\angle 1 > m\angle 2$
    d. $m\angle 3 > m\angle 4$
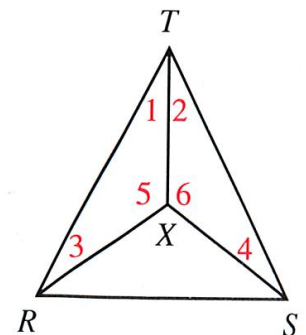
11. Which of the following is an important part of an indirect proof?
    a. Proving that the hypothesis *cannot* be deduced from the conclusion
    b. Proving that the temporary assumption must be true
    c. Assuming temporarily that the conclusion must be true
    d. Finding a contradiction of a known fact

Chapter 7

Indicate the best answer by writing the appropriate letter.

1. If the measures of the angles of a triangle are in the ratio $3:3:4$, what is the measure of the largest angle of the triangle?
   - **a.** 40
   - **b.** 54
   - **c.** 72
   - **d.** 90

2. If $\triangle ABC \sim \triangle JOT$, which of these is a correct proportion?
   - **a.** $\dfrac{BC}{AC} = \dfrac{JT}{OT}$
   - **b.** $\dfrac{AB}{JT} = \dfrac{AC}{JO}$
   - **c.** $\dfrac{AB}{BC} = \dfrac{OT}{JT}$
   - **d.** $\dfrac{AC}{JT} = \dfrac{BC}{OT}$

3. If $\dfrac{a}{b} = \dfrac{x}{y}$, what does $\dfrac{y}{b}$ equal?
   - **a.** $\dfrac{x}{a}$
   - **b.** $\dfrac{a}{x}$
   - **c.** $\dfrac{y}{x}$
   - **d.** $\dfrac{b}{y}$

4. $\triangle ABC \sim \triangle DEF$, $AB = 8$, $BC = 12$, $AC = 16$, and $DE = 12$. What is the perimeter of $\triangle DEF$?
   - **a.** 36
   - **b.** 40
   - **c.** 48
   - **d.** 54

5. Which of the following pairs of polygons *must* be similar?
   - **a.** two rectangles
   - **b.** two regular hexagons
   - **c.** two isosceles triangles
   - **d.** two parallelograms with a 60° angle

6. Quad. $GHJK \sim$ quad. $RSTU$, $GH = JK = 10$, $HJ = KG = 14$, and $RS = TU = 16$. What is the scale factor of quad. $GHJK$ to quad. $RSTU$?
   - **a.** $\dfrac{5}{7}$
   - **b.** $\dfrac{5}{8}$
   - **c.** $\dfrac{7}{8}$
   - **d.** $\dfrac{16}{10}$

7. Which of the following can you use to prove that the two triangles are similar?
   - **a.** SAS Similarity Theorem
   - **b.** AA Similarity Postulate
   - **c.** SSS Similarity Theorem
   - **d.** Def. of similar triangles

   Exs. 7, 8

8. Which statement is correct?
   - **a.** $\dfrac{6}{10} = \dfrac{8}{x}$
   - **b.** $\dfrac{6}{8} = \dfrac{x}{10}$
   - **c.** $6 \cdot 10 = 8x$
   - **d.** $\dfrac{5}{y} = \dfrac{8}{10}$

9. What is the value of u?
   - **a.** 8
   - **b.** 10
   - **c.** 16
   - **d.** 25

10. What is the value of z?
    - **a.** 25
    - **b.** 28
    - **c.** $\dfrac{28}{3}$
    - **d.** $\dfrac{70}{3}$

    Exs. 9, 10

11. In $\triangle APC$, the bisector of $\angle P$ meets $\overline{AC}$ at B. $PA = 30$, $PC = 50$, and $AB = 12$. What is the length of $\overline{BC}$?
    - **a.** $\dfrac{36}{5}$
    - **b.** 12
    - **c.** 20
    - **d.** 32

12. If $\triangle RST \sim \triangle XYZ$, what is the ratio of $m \angle S$ to $m \angle Y$?
    - **a.** $m \angle R : m \angle Z$
    - **b.** $1:1$
    - **c.** $RS:XY$
    - **d.** not enough information