Geometry: Plan for Final Exam Review

The final exam is worth 15% of the final course grade, or about 100 points. For example, if your final exam grade is 10% above or below your pre-final-exam grade, your final course grade will change by only 1.5% (0.15*10). If the final exam is 20% different, your course grade will be 3% different.

No new topics as of Friday 12/5.

Quiz is on Monday 12/8 (F Block) or Tuesday 12/9 (E Block).
Chapter 3 Quiz #4 (353) (Parallel lines, Triangles, and Polygons)
Review is P17 plus polygon vocabulary.

We will work on the review during class and at home.
*All review material is available at http://teach.kralsite.com.

Due Wed 12/10 (E Block) or Thu 12/11 (F Block) at the end of class:
Sheet 370: "Ch 1–3 Practice Review" (handouts*, not in packets) practice exam: **1–15, 23–24, 25–26, 29, 30**.
This is the most important review. Due date can be extended through Workshop.

Due Friday 12/12:
Refresh yourself on Chapter 2 Review, G222, last page in LogicPacket: **1–3, 12–13**.
Chapter 3 Review, P18, last page in ParallelPacket: **1–7, 13–15, 18**.

Due Monday 12/15
Sheet 371: Cumulative Review: Chapters 1–3 (handouts*, not in packets): **11, 23–26, 41, 44, 45.**

Final Examination date will be announced. It will be sometime Tue 12/16 am through Thu 12/18 am.

Sheet#0351: Postulates, Properties, and Theorems 2

Segment Addition Postulate (#2)	$AB + BC = AC$
Angle Addition Postulate (#4)	$m\angle AOB + m\angle BOC = m\angle AOC$
Addition Property of Equality (1)	If $a = b$ and $c = d$, then $a + c = b + d$
Subtraction Property of = (2)	If $a = b$ and $c = d$, then $a - c = b - d$
Multiplication Property of = (3)	If $a = b$ then $ca = cb$
Division Property of = (4)	If $a = b$ then $a/c = b/c$ for $c \neq 0$
Substitution Property of = (5)	If $a = b$ then a or b may be substituted for the other in any equation.
Reflexive Property of Equality (6)	$a = a$
Symmetric Property of = (7)	If $a = b$, then $b = a$
Transitive Property of = (8)	If $a = b$ and $b = c$ then $a = c$
Reflexive Property of Congruence (9)	$\overline{AB} \cong \overline{AB}$ (and likewise for angles)
Symmetric Property of $\cong$ (10)	If $\overline{AB} \cong \overline{CD}$ then $\overline{CD} \cong \overline{AB}$
Transitive Property of $\cong$ (11)	If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$ then $\overline{AB} \cong \overline{EF}$
Midpoint Theorem (2–1)	If M is the midpoint of $\overline{AB}$ then $AM = ½\ AB$ and $MB = ½\ AB$
Angle Bisector Theorem (2–2)	If $\overrightarrow{BX}$ is the bisector of $\angle ABC$ then $m\angle ABX = ½m\angle ABC$ and $m\angle XBC = ½m\angle ABC$
Vertical Angles Theorem (2–3)	Vertical angles are congruent.
Perpendicular Lines Theorem (2–4)	If two lines are perpendicular, then they form congruent adjacent angles.
Perpendicular Lines Theorem Converse (2–5)	If two lines form congruent adjacent angles, then the lines are perpendicular.
Corresponding Angles Postulate (#10)	If two parallel lines are cut by a transversal, then corresponding angles are congruent.
Corresponding Angles Postulate Converse (#11)	If two lines are cut by a transversal and corresponding angles are congruent, then the lines are parallel.
AIA Theorem (3–2)	If two parallel lines are cut by a transversal, then alternate interior angles are congruent.
AIA Theorem Converse (3–5)	If two lines are cut by a transversal and alternate interior angles are congruent, then the lines are parallel.
SSIA Theorem (3–3)	If two parallel lines are cut by a transversal, then same-side interior angles are supplementary.
SSIA Theorem Converse (3–6)	If two lines are cut by a transversal and same-side interior angles are supplementary, then the lines are parallel.
Triangle Sum Theorem (3–11)	The sum of the measures of the interior angles of a triangle is 180º.
Exterior Angle Theorem (3–12)	The measure of an exterior angle of a triangle equals the sum of the measures of the two remote (non-adjacent) interior angles.
Polygon Interior Angles Theorem (3–13)	The sum of the measures of the interior angles of a convex polygon with n sides is $(n-2)180°$.
Polygon Exterior $\angle$s Theorem (3–14)	The sum of the measures of the exterior angles of any convex polygon, one angle at each vertex, is 360º.

Sheet 370: Ch 1-3 Practice Review

Name:

Cumulative Reviews

Chapters 1–3

Complete.

1. If Q is between P and R, then PQ + ___?___ = ___?___.
2. Four or more points lying in one plane are said to be ___?___.
3. In $\triangle DEF$, the angle included between $\overline{DF}$ and $\overline{EF}$ is $\angle$ ___?___.
4. If two parallel lines are cut by a transversal, then ___?___ angles are congruent.
5. If $\overrightarrow{BE}$ bisects $\angle ABC$, then $\angle$ ___?___ $\cong \angle$ ___?___.
6. If point D lies between points A and C, then $\angle ADC$ is a(n) ___?___ angle.

7. Two lines parallel to a third line are ___?___.
8. One of two congruent adjacent supplementary angles is called a(n) ___?___ angle.
9. The measure of an ___?___ angle of a triangle equals the sum of the measures of the two remote interior angles.
10. If $m\angle A = 57$, what is the measure of a complement of $\angle A$?
11. On a number line point A has coordinate -4 and point B has coordinate 8.
    a. Find the length of $\overline{AB}$.
    b. Find the coordinate of the midpoint of $\overline{AB}$.

12. If two angles of a triangle have measures 23 and 110, what is the measure of the third angle?
13. Find the sum of the measures of the angles of a polygon with 11 sides.
14. If seven exterior angles of an octagon each have measure 42, what is the measure of the eighth exterior angle?
15. Consider the statement: Any equilateral triangle has congruent sides.
    a. Write the statement in if-then form.
    b. Write the converse of the statement.

Sheet 370: Ch 1-3 Practice Review

Name:

Justify each statement with a property from algebra or a property of congruence.

20. If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

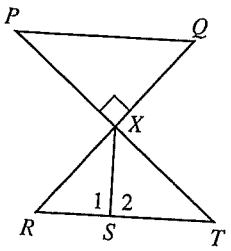
21. If $RS = XY$ and $ST = YZ$, then $RS + ST = XY + YZ$.

22. If $m\angle 1 + m\angle 2 = m\angle 3$ and $m\angle 2 = m\angle 4$, then $m\angle 1 + m\angle 4 = m\angle 3$.

Exercises 16 and 17 refer to the diagram.

16. Find the measure of $\angle RXT$. State the theorem that justifies your answer.

17. Name two pairs of supplementary angles.



Exs. 16–19

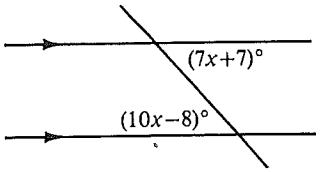
State the definition or theorem that justifies the statement about the diagram at the right.

18. If $\overline{XS} \perp \overline{RT}$, then $\angle 1 \cong \angle 2$.

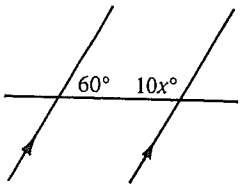
19. If $\angle 1 \cong \angle 2$, then $\overline{XS} \perp \overline{RT}$.

Find the value of x.

23.



24.

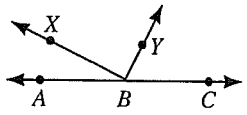


Name:

25. A supplement of an angle is four times as large as a complement of the angle. Find the measure of the angle.

26. If each interior angle of a regular polygon has measure 135, find the number of sides of the polygon.

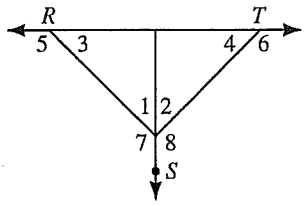
What can you conclude from the given information?



27. Given: $\overrightarrow{BX} \perp \overrightarrow{BY}$

28. Given: $\angle ABX$ and $\angle YBC$ are comp. $\measuredangle$s.

29. Given: $\angle 1$ and $\angle 2$ are comp. $\measuredangle$s;
$\angle 1$ and $\angle 4$ are comp. $\measuredangle$s;
$\angle 2$ and $\angle 3$ are comp. $\measuredangle$s.



a. $\angle 1 \cong \angle$?

b. $\angle 2 \cong \angle$?

c. $\angle 5 \cong \angle$?

d. $\angle 6 \cong \angle$?

e. If $m\angle 8 = 150$, then $m\angle 7 =$?.

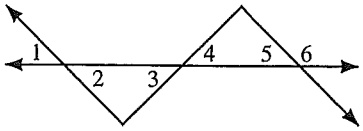
f. If $m\angle 1 = 45$, then $m\angle 6 =$?.

Sheet 370: Ch 1-3 Practice Review

Name:

Write a two-column proof.

30. Given: $\angle 2 \cong \angle 3$;
$\angle 4 \cong \angle 5$
Prove: $\angle 1$ is supp. to $\angle 6$.



1. $\overline{QR}$; $\overline{PR}$ **2.** coplanar **3.** F **4.** corresponding or alternate interior **5.** ABE, EBC **6.** straight **7.** parallel **8.** right **9.** exterior **10.** 33 **11. a.** 12 **b.** 2 **12.** 47 **13.** 1620 **14.** 66 **15. a.** If a $\triangle$ is equilateral, then the sides of the $\triangle$ are $\cong$. **b.** If the sides of a $\triangle$ are $\cong$, then the $\triangle$ is equilateral. **16.** 90; Vertical $\measuredangle$ are $\cong$. **17.** Answers may vary. $\angle 1$ and $\angle 2$, $\angle PXQ$ and $\angle QXT$ **18.** If 2 lines are $\perp$, then they form $\cong$ adj. $\measuredangle$. **19.** If 2 lines form $\cong$ adj. $\measuredangle$, then the lines are $\perp$. **20.** Trans. Prop. **21.** Add. Prop. of $=$ **22.** Subst. Prop. **23.** 5 **24.** 12 **25.** 60 **26.** 8 Answers may vary in Exs. 27–28. **27.** $m\angle XBY = 90$, $\angle ABX$ and $\angle YBC$ are complementary. **28.** $\angle XBY$ is a rt. $\angle$, $\overrightarrow{BX} \perp \overrightarrow{BY}$ **29. a.** 3 **b.** 4 **c.** 7 **d.** 8 **e.** 120 **f.** 135 **30.** 1. $\angle 1 \cong \angle 2$ (Vert. $\measuredangle$ are $\cong$.) 2. $\angle 2 \cong \angle 3$ (Given) 3. $\angle 3 \cong \angle 4$ (Vert. $\measuredangle$ are $\cong$.) 4. $\angle 4 \cong \angle 5$ (Given) 5. $\angle 1 \cong \angle 5$ or $m\angle 1 = m\angle 5$ (Trans. Prop. used several times) 6. $m\angle 5 + m\angle 6 = 180$ ($\angle$ Add. Post.) 7. $m\angle 1 + m\angle 6 = 180$ (Subst. Prop.) 8. $\angle 1$ is supp. to $\angle 6$. (Def. of supp. $\measuredangle$)

Chapter Review

Use the conditional: If $m\angle 1 = 120$, then $\angle 1$ is obtuse.

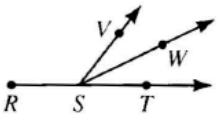
1. Write the hypothesis and the conclusion of the conditional. **2–1**
2. Write the converse of the conditional.
3. Provide a counterexample to disprove the converse.
4. Write a definition of a straight angle as a biconditional.

Justify each statement with a property from algebra or a property of congruence.

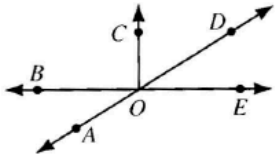
5. If $m\angle A + m\angle B + m\angle C = 180$ and $m\angle C = 50$, then $m\angle A + m\angle B + 50 = 180$. **2–2**
6. If $m\angle A + m\angle B + 50 = 180$, then $m\angle A + m\angle B = 130$.
7. If $6x = 18$, then $x = 3$.
8. If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$.

Name the definition, postulate, or theorem that justifies the statement.

9. If $\overline{RS} \cong \overline{ST}$, then S is the midpoint of $\overline{RT}$. **2–3**
10. If $\overrightarrow{SW}$ bisects $\angle VST$, then $\angle VSW \cong \angle WST$.
11. If $\overrightarrow{SW}$ bisects $\angle VST$, then $m\angle WST = \frac{1}{2}m\angle VST$.



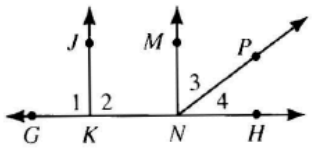
12. If $\angle BOC$ is a right angle and $m\angle COD = 58$, then $m\angle DOE =$?, $m\angle BOA =$?, and $m\angle AOC =$?. **2–4**
13. Name a supplement of $\angle AOE$.



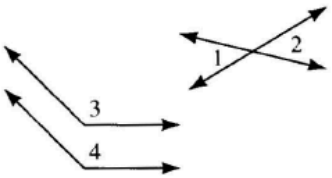
14. A supplement of a given angle is four times as large as a complement of the angle. Find the measure of the given angle.

Name the definition or state the theorem that justifies the statement about the diagram.

15. If $\overrightarrow{KJ} \perp \overleftrightarrow{GH}$, then $\angle 1$ is a right angle. **2–5**
16. If $\angle 2$ is a 90° angle, then $\overrightarrow{KJ} \perp \overleftrightarrow{GH}$.
17. If $\overrightarrow{NM} \perp \overleftrightarrow{GH}$, then $\angle MNK \cong \angle MNH$.
18. If $\overrightarrow{NM} \perp \overleftrightarrow{GH}$, then $\angle 3$ and $\angle 4$ are complementary.



19. Write a plan for a proof. **2–6**
Given: $\angle 3$ is a supplement of $\angle 1$;
$\angle 4$ is a supplement of $\angle 2$.
Prove: $\angle 3 \cong \angle 4$
20. Write a proof in two-column form for Exercise 19.



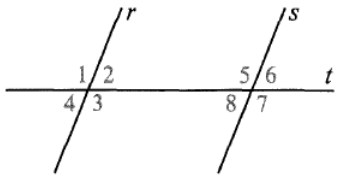
Chapter Review

1. $\angle 5$ and $\angle$? are same-side interior angles. 3–1

2. $\angle 5$ and $\angle 1$ are ? angles.

3. $\angle 5$ and $\angle 3$ are ? angles.

4. Line j, not shown, does not intersect line r. Must lines r and j be parallel?



Exs. 1–7

In the diagram above, $r \parallel s$.

5. If $m\angle 1 = 105$, then $m\angle 5 =$? and $m\angle 7 =$?. 3–2

6. Solve for x: $m\angle 2 = 70$ and $m\angle 8 = 6x - 2$

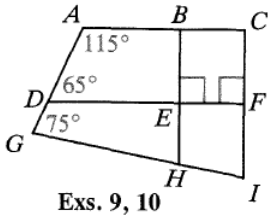
7. Solve for y: $m\angle 3 = 8y - 40$ and $m\angle 8 = 2y + 20$

8. Lines a, b, and c are coplanar, $a \parallel b$, and $a \perp c$. What can you conclude? Explain.

9. Which line is parallel to $\overleftrightarrow{AB}$? Why? 3–3

10. Name a pair of parallel lines other than the pair in Exercise 9. Why must they be parallel?

11. Name five ways to prove two lines parallel.



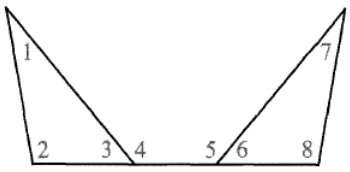
Exs. 9, 10

12. If x and $2x - 15$ represent the measures of the acute angles of a right triangle, find the value of x. 3–4

13. $m\angle 6 + m\angle 7 + m\angle 8 =$?

14. If $m\angle 1 = 30$ and $m\angle 4 = 130$, then $m\angle 2 =$?.

15. If $\angle 4 \cong \angle 5$ and $\angle 1 \cong \angle 7$, name two other pairs of congruent angles and give a reason for each answer.



Exs. 13–15

16. **a.** Sketch a hexagon that is equiangular but not equilateral. 3–5
b. What is its interior angle sum?
c. What is its exterior angle sum?

17. A regular polygon has 18 sides. Find the measure of each interior angle.

18. A regular polygon has 24 sides. Find the measure of each exterior angle.

19. Each interior angle of a regular polygon has measure 150. How many sides does the polygon have?

Name: _____

Sheet 371: Cumulative Review: Chapters 1–3

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

1. If $\overleftrightarrow{AB}$ intersects $\overline{CD}$, then $\overline{AB}$ ___?___ intersects $\overline{CD}$.
2. If two planes intersect, their intersection is ___?___ a line.
3. If $a \perp c$ and $b \perp c$, then a and b are ___?___ parallel.
4. If two parallel planes are cut by a third plane, then the lines of intersection are ___?___ coplanar.
5. A scalene triangle ___?___ has an acute angle.

Draw a diagram that satisfies the conditions stated. If the conditions cannot be satisfied, write *not possible*.

6. $\overline{AB}$ and $\overline{XY}$ intersect and A is the midpoint of $\overline{XY}$.
7. A triangle is isosceles but not equilateral.
8. Three points all lie in both plane M and plane N.
9. Two lines intersect to form adjacent angles that are not supplementary.

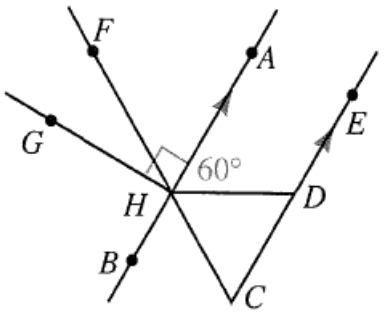
10. Points A and B on a number line have coordinates -3.5 and 8.5. Find the coordinate of the midpoint of $\overline{AB}$.

11. $\overrightarrow{QX}$ bisects $\angle PQR$, $m\angle PQX = 5x + 13$, and $m\angle XQR = 9x - 39$. Find (a) the value of x and (b) $m\angle PQR$.

12. The measure of a supplement of an angle is 35 more than twice the complement of the angle. Find the measures of the angle, its supplement, and its complement.

13. The measures of two angles of a triangle are five and six times as large as the measure of the smallest angle. Find all three measures.

In the diagram $\overleftrightarrow{AB}$ bisects $\angle DHF$, $\overleftrightarrow{AB} \perp \overline{GH}$, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, and $m\angle AHD = 60$. Find the measure of each angle.



14. $\angle FHD$	15. $\angle AHG$	16. $\angle FHG$
17. $\angle GHB$	18. $\angle BHC$	19. $\angle DHC$
20. $\angle HDE$	21. $\angle HDC$	22. $\angle HCD$

Tell whether each statement is true or false. Then write the converse and tell whether it is true or false.

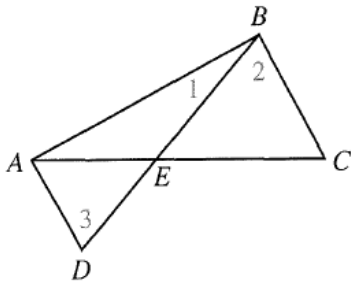
23. If two lines do not intersect, then they are parallel.

24. If two lines intersect to form right angles, then the lines are perpendicular.

25. An angle is acute only if it is not obtuse.

26. A triangle is isosceles if it is equilateral.

Name or state the postulate, definition, or theorem that justifies each statement about the diagram.



27. $\angle AED \cong \angle BEC$

28. $AE + EC = AC$

29. $m\angle 1 + m\angle 2 = m\angle ABC$

30. If $\angle 2 \cong \angle 3$, then $\overline{AD} \parallel \overline{BC}$.

31. $m\angle AEB = m\angle 2 + m\angle C$

32. If $\overline{DA} \perp \overline{AB}$, then $m\angle DAB = 90$.

33. $m\angle 1 + m\angle 3 + m\angle DAB = 180$

34. If $\angle ABC$ is a right angle, then $\overline{AB} \perp \overline{BC}$.

Complete.

35. The endpoint of $\overrightarrow{XY}$ is point ___?___.

36. If the sum of the measures of two angles is 180, then the angles are ___?___.

37. If the measure of each interior angle of a regular polygon is 108, then the polygon is a(n) ___?___.

38. If M is the midpoint of $\overline{AB}$ and $AM = 12$, then $AB =$ ___?___.

39. If two parallel lines are cut by a transversal, then alternate interior angles are ___?___.

40. The process of forming a conclusion based on past observations or patterns is called ___?___ reasoning.

41. When a statement and its converse are both true, they can be combined into one statement called a ___?___.

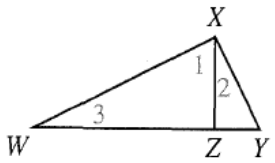
42. In a decagon the sum of the measures of the exterior angles is ___?___.

43. In an octagon the sum of the measures of the interior angles is ___?___.

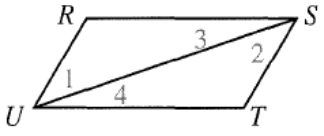
44. Every triangle has at least two ___?___ angles.

Write a two column proof.

45. Given: $\overline{WX} \perp \overline{XY}$;
$\angle 1$ is comp. to $\angle 3$.
Prove: $\angle 2 \cong \angle 3$



46. Given: $\overline{RU} \parallel \overline{ST}$; $\angle R \cong \angle T$
Prove: $\overline{RS} \parallel \overline{UT}$

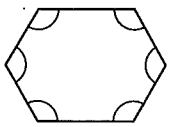


Pages 67–68 • CHAPTER REVIEW Ch. 2

1. H: $m\angle 1 = 120$, C: $\angle 1$ is obtuse 2. If $\angle 1$ is obtuse, then $m\angle 1 = 120$.
3. Answers may vary; for example, $m\angle 1 = 100$
4. An angle is a straight angle if and only if the measure of the angle is 180.
5. Substitution Prop. 6. Subtr. Prop. of = 7. Div. Prop. of = 8. Trans. Prop.
9. Def. of midpt. 10. Def. of $\angle$ bisector 11. $\angle$ Bis. Thm. 12. 32; 32; 122
13. $\angle BOA$ or $\angle DOE$
14. $180 - x = 4(90 - x)$; $180 - x = 360 - 4x$; $3x = 180$; $x = 60$
15. Def. of $\perp$ lines 16. Def. of $\perp$ lines
17. If 2 lines are $\perp$, then they form $\cong$ adj. $\measuredangle$s.
18. If the ext. sides of 2 adj. acute $\measuredangle$s are $\perp$, then the $\measuredangle$s are comp.
19. Show that $\angle 3$ and $\angle 4$ are supps. of $\cong$ $\measuredangle$s.
20.

Statements	Reasons
1. $\angle 3$ is a supplement of $\angle 1$; $\angle 4$ is a supplement of $\angle 2$.	1. Given
2. $\angle 1 \cong \angle 2$	2. Vert. $\measuredangle$s are $\cong$.
3. $\angle 3 \cong \angle 4$	3. If 2 $\measuredangle$s are supps. of $\cong$ $\measuredangle$s, then the 2 $\measuredangle$s are $\cong$.

Pages 111–112 • CHAPTER REVIEW Ch-3

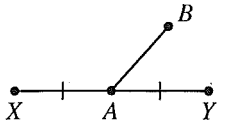
1. 2 2. corr. 3. alt. int. 4. No; they can be skew. 5. 105, 105
6. $70 = 6x - 2$; $x = 12$ 7. $(8y - 40) + (2y + 20) = 180$; $y = 20$
8. $b \perp c$; if a trans. is $\perp$ to one of 2 $\parallel$ lines, then it is $\perp$ to the other one also.
9. $\overleftrightarrow{DE}$; $\angle A$ is supp. to $\angle ADE$, and if 2 lines are cut by a trans. and s-s. int. $\measuredangle$s are supp., then the lines are $\parallel$.
10. $\overleftrightarrow{BE} \parallel \overleftrightarrow{CF}$; both are $\perp$ to $\overleftrightarrow{DF}$.
11. corr. $\measuredangle$s $\cong$; alt. int. $\measuredangle$s $\cong$; s-s. int. $\measuredangle$s supp.; in a plane, both lines are $\perp$ to a third line; both lines are $\parallel$ to a third line.
12. $x + (2x - 15) = 90$; $x = 35$ 13. 180 14. 100
15. $\angle 3 \cong \angle 6$ (If 2 $\measuredangle$s are supps. of $\cong$ $\measuredangle$s, then the 2 $\measuredangle$s are $\cong$.), $\angle 2 \cong \angle 8$ (If 2 $\measuredangle$s of one $\triangle$ are $\cong$ to 2 $\measuredangle$s of another $\triangle$, then the third $\measuredangle$s are $\cong$.)
16. a. 
b. $(6 - 2)180 = 720$
c. 360
17. $\frac{(18 - 2)180}{18} = 160$ 18. $\frac{360}{24} = 15$ 19. $\frac{(n - 2)180}{n} = 150$; $n = 12$
20. 75, 90 21. $\frac{1}{100}, -\frac{1}{1000}$

Pages 114–115 • CUMULATIVE REVIEW: CHAPTERS 1–3

A **1.** sometimes **2.** always **3.** sometimes **4.** always **5.** always

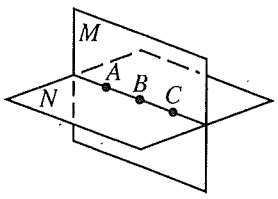
6–8. Sketches may vary.

6.



7.

8.



9. not possible **10.** $\frac{-3.5 + 8.5}{2} = \frac{5}{2}$ or 2.5

11. $5x + 13 = 9x - 39$, $x = 13$; $m\angle PQR = 2m\angle PQX = 2[5(13) + 13] = 156$

12. $180 - x = 2(90 - x) + 35$, $x = 35$; $\angle$ measure: 35, supp. measure: 145; comp. measure: 55

13. $x + 5x + 6x = 180$, $x = 15$; $\angle$ measures: 15, 75, 90 **14.** $2(60) = 120$ **15.** 90

16. $90 - 60 = 30$ **17.** 90 **18.** 60 **19.** $180 - 2(60) = 60$

20. $180 - 60 = 120$ **21.** $180 - 120 = 60$ **22.** $180 - 2(60) = 60$

23. False. If 2 lines are $\parallel$, then they do not intersect; true.

24. True. If 2 lines are $\perp$, then they intersect to form rt. $\measuredangle$s; true.

25. True. If an $\angle$ is not obtuse, then it is acute; false.

26. True. If a $\triangle$ is isos., then it is equilateral; false.

27. Vert. $\measuredangle$s are $\cong$. **28.** Seg. Add. Post. **29.** $\angle$ Add. Post.

30. If 2 lines are cut by a trans. and alt. int. $\measuredangle$s are $\cong$, then the lines are $\parallel$.

31. The meas. of an ext. $\angle$ of a $\triangle$ = the sum of the meas. of the 2 remote int. $\measuredangle$s.

32. Def. of $\perp$ lines **33.** The sum of the meas. of the $\measuredangle$s of a $\triangle$ is 180.

34. Def. of $\perp$ lines **35.** X **36.** supp. **37.** $\frac{(n - 2)180}{n} = 108$, $n = 5$; pentagon

38. $2(12) = 24$ **39.** $\cong$ **40.** inductive **41.** biconditional **42.** 360

43. $(8 - 2)180 = 1080$ **44.** acute

B **45.**

Statements	Reasons
1. $\overline{WX} \perp \overline{XY}$	1. Given
2. $\angle 1$ is comp. to $\angle 2$.	2. If the ext. sides of 2 adj. acute $\measuredangle$s are $\perp$, then the $\measuredangle$s are comp.
3. $\angle 1$ is comp. to $\angle 3$.	3. Given
4. $\angle 2 \cong \angle 3$	4. If 2 $\measuredangle$s are comps. of the same $\angle$, then the 2 $\measuredangle$s are $\cong$.

46.

Statements	Reasons
1. $\overline{RU} \parallel \overline{ST}$	1. Given
2. $\angle 1 \cong \angle 2$	2. If 2 $\parallel$ lines are cut by a trans., then alt. int. $\measuredangle$s are $\cong$.
3. $\angle R \cong \angle T$	3. Given
4. $\angle 3 \cong \angle 4$	4. If 2 $\measuredangle$s of one $\triangle$ are $\cong$ to 2 $\measuredangle$s of another $\triangle$, then the third $\measuredangle$s are $\cong$.
5. $\overline{RS} \parallel \overline{UT}$	5. If 2 lines are cut by a trans. and alt. int. $\measuredangle$s are $\cong$, then the lines are $\parallel$.

Sheet 272: Chapter 2 Test

1. Use the conditional: Two angles are congruent if they are vertical angles.
a. Write the hypothesis. **b.** Write the converse.

2. Provide a counterexample to disprove the statement:
If $x^2 > 4$, then $x > 2$.

3. Write the biconditional as two conditionals that are converses of each other:
Angles are congruent if and only if their measures are equal.

4. Supply reasons to justify the steps:

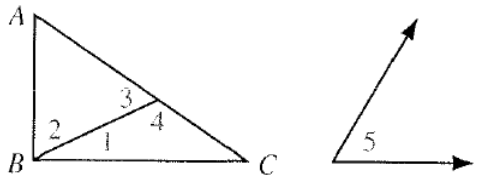
Steps	*Reasons*
1. $y = 12$	1. Given
2. $5x = 2x + y$	2. Given
3. $5x = 2x + 12$	3. ?
4. $3x = 12$	4. ?
5. $x = 4$	5. ?

5. $\overrightarrow{OB}$ is the bisector of $\angle AOC$ and $\overrightarrow{OC}$ is the bisector of $\angle BOD$.
$m\angle AOC = 60$. Find $m\angle COD$.

6. S is the midpoint of $\overline{RT}$ and W is the midpoint of $\overline{ST}$. If $RT = 32$, find ST, WT, and RW.

7. In the diagram, $\overline{AB} \perp \overline{BC}$. Name:
a. two supplementary angles
b. two complementary angles

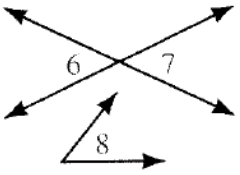
8. Given: $\angle 5$ is supplementary to $\angle 4$.
a. What can you conclude about $\angle 5$ and $\angle 3$?
b. State the theorem that justifies your conclusion



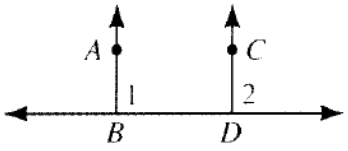
9. Suppose $m\angle 3 = 3x + 5$ and $m\angle 4 = 6x + 13$. Find the value of x.

10. State the theorem that justifies the statement $\angle 6 \cong \angle 7$.

11. Suppose you have already stated that $\angle 6 \cong \angle 7$ and $\angle 7 \cong \angle 8$. What property of congruence justifies the conclusion that $\angle 6 \cong \angle 8$?



12. Write a proof in two-column form.
Given: $\overrightarrow{DC} \perp \overleftrightarrow{BD}$; $\angle 1 \cong \angle 2$
Prove: $\overrightarrow{BA} \perp \overleftrightarrow{BD}$



Pages 68–69 • CHAPTER TEST Ch. 2

1. **a.** they are vert. ∡s **b.** If 2 ∡s are ≅, then they are vert. ∡s.
2. Answers may vary; for example, $x = -3$
3. If ∡s are ≅, then their measures are =. If ∡s have = measures, then they are ≅.
4. 3. Substitution Prop. 4. Subtr. Prop. of = 5. Div. Prop. of =
5. 30 **6.** 16; 8; 24 **7. a.** $\angle 3$ and $\angle 4$ **b.** $\angle 1$ and $\angle 2$
8. **a.** They are ≅. **b.** If 2 ∡s are supps. of the same ∠, then the 2 ∡s are ≅.
9. $(3x + 5) + (6x + 13) = 180$; $9x + 18 = 180$; $9x = 162$; $x = 18$
10. Vert. ∡s are ≅. **11.** Trans. Prop.

12.

Statements	Reasons
1. $\overrightarrow{DC} \perp \overleftrightarrow{BD}$	1. Given
2. $m\angle 2 = 90$	2. Def. of ⊥ lines
3. $\angle 1 \cong \angle 2$, or $m\angle 1 = m\angle 2$	3. Given
4. $m\angle 1 = 90$	4. Substitution Prop.
5. $\overrightarrow{BA} \perp \overleftrightarrow{BD}$	5. Def. of ⊥ lines

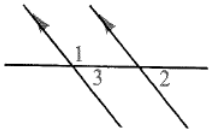
Sheet 373: Chapter 3 Test

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

1. Two lines that have no points in common are ___?___ parallel.
2. If a line is perpendicular to one of two parallel lines, then it is ___?___ perpendicular to the other one.
3. If two lines are cut by a transversal and same-side interior angles are complementary, then the lines are ___?___ parallel.
4. An obtuse triangle is ___?___ a right triangle.
5. In $\triangle ABC$, if $\overline{AB} \perp \overline{BC}$, then $\overline{AC}$ is ___?___ perpendicular to $\overline{BC}$.
6. As the number of sides of a regular polygon increases, the measure of each exterior angle ___?___ decreases.

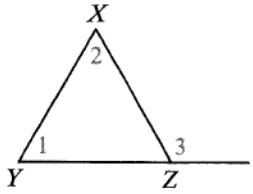
Find the value of x.

7. $m\angle 1 = 3x - 20$, $m\angle 2 = x$
8. $m\angle 2 = 2x + 12$, $m\angle 3 = 4(x - 7)$

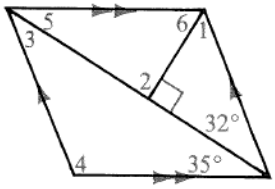


Find the measures of the numbered angles.

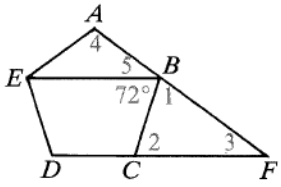
9. XYZ is regular.



10.

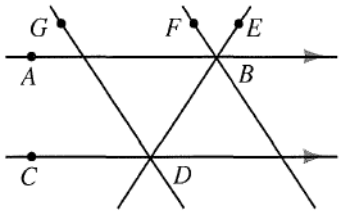


11. $ABCDE$ is regular.



12. In the diagram for Exercise 11, explain why $\overline{EB}$ and $\overline{DF}$ must be parallel.

13. Given: $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$; $\overrightarrow{BF}$ bisects $\angle ABE$; $\overrightarrow{DG}$ bisects $\angle CDB$.
Prove: $\overleftrightarrow{BF} \parallel \overleftrightarrow{DG}$



Pages 112–113 • CHAPTER TEST Ch-3

1. sometimes 2. sometimes 3. never 4. never 5. never 6. always

7. $(3x - 20) + x = 180; x = 50$ 8. $2x + 12 = 4(x - 7); x = 20$

9. $m\angle 1 = m\angle 2 = 60, m\angle 3 = 120$

10. $m\angle 1 = 58, m\angle 2 = 90, m\angle 3 = 32, m\angle 4 = 180 - (32 + 35) = 113, m\angle 5 = 35, m\angle 6 = 55$

11. $m\angle 4 = \frac{(5 - 2)180}{5} = 108, m\angle 5 = 108 - 72 = 36, m\angle 1 = 180 - 108 = 72, m\angle 2 = 180 - 108 = 72, m\angle 3 = 180 - (72 + 72) = 36$

12. $\angle EBC \cong \angle 2$ (If 2 lines are cut by a trans. and alt. int. $\measuredangle$s are $\cong$, then the lines are $\parallel$.), or $\angle 5 \cong \angle 3$ (If 2 lines are cut by a trans. and corr. $\measuredangle$s are $\cong$, then the lines are $\parallel$.)

13.

Statements	Reasons
1. $\overrightarrow{BF}$ bisects $\angle ABE$; $\overrightarrow{DG}$ bisects $\angle CDB$.	1. Given
2. $m\angle GDB = \frac{1}{2}m\angle CDB$; $m\angle FBE = \frac{1}{2}m\angle ABE$	2. $\angle$ Bis. Thm.
3. $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$	3. Given
4. $m\angle CDB = m\angle ABE$	4. If 2 $\parallel$ lines are cut by a trans., then corr. $\measuredangle$s are $\cong$.
5. $\frac{1}{2}m\angle CDB = \frac{1}{2}m\angle ABE$	5. Div. Prop. of $=$
6. $m\angle GDB = m\angle FBE$	6. Substitution Prop.
7. $\overleftrightarrow{BF} \parallel \overleftrightarrow{DG}$	7. If 2 lines are cut by a trans. and corr. $\measuredangle$s are $\cong$, then the lines are $\parallel$.

14. 15, 17