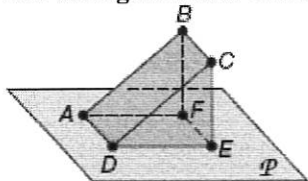


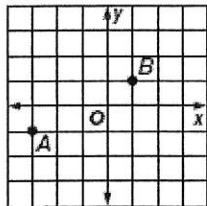
**Geometry Honors Semester 1 Exam Review**

Use the figure below to answer the following questions.



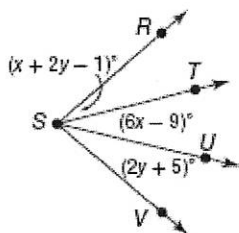
- Name five planes shown in the figure.
- Name a line that is coplanar with  $\overleftrightarrow{AD}$  and  $\overleftrightarrow{AB}$ .
- The midpoint of a line segment  $AB$  is  $(1, 2)$ . Point  $A$  coordinates are  $(3, -3)$  and point  $B$  coordinates are  $(x, 7)$ . Find the value of  $x$ .
- Find two possible lengths for  $\overline{CD}$  if  $C, D,$  and  $E$  are collinear,  $CE = 15.8$  centimeters, and  $DE = 3.5$  centimeters.
- Find the length of  $\overline{RS}$  if  $S$  is between  $R$  and  $T$ , the length of  $\overline{RS}$  is  $\frac{1}{3}$  the length of  $\overline{RT}$ ,  $RS = 3x - 3$ , and  $ST = 2x + 6$ .
- Find the value of  $y$  if  $AC = 3y + 5$ ,  $CB = 4y - 1$ ,  $AB = 9y - 12$ , and point  $C$  lies between  $A$  and  $B$ .

Use the coordinate grid to answer the following questions.

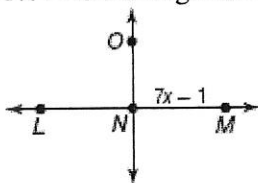


- Find the distance between  $A$  and  $B$ .
- If  $\overline{AB}$  is the hypotenuse of a right triangle, what is the area of the triangle?
- Angles  $\angle ABC$  and  $\angle CBD$  form a linear pair at the vertex point  $B$ . Which three points,  $A, B, C,$  or  $D$ , are collinear?
- Find the value of  $y$  if  $S$  is the midpoint of  $\overline{RT}$ ,  $T$  is the midpoint of  $\overline{RU}$ ,  $RS = 6x + 5$ ,  $ST = 8x - 1$ , and  $TU = 11y + 13$ .
- Find all values of  $x$  that will make  $\angle A$  an obtuse angle given  $m\angle A = 12x - 6$ .
- Find  $m\angle RST$  if  $\overrightarrow{ST}$  bisects  $\angle RSU$  and  $\overrightarrow{SU}$  bisects  $\angle TSV$ .

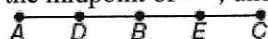
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13. Find  $m\angle 1$  if  $\angle 1$  is complementary to  $\angle 2$ ,  $\angle 2$  is supplementary to  $\angle 3$ , and  $m\angle 3 = 126$ .
14. Find the value of  $y$  if  $\overrightarrow{XW} \perp \overrightarrow{XZ}$ ,  $Y$  is in the interior of  $\angle WXZ$ ,  $m\angle WXY = 6y - 3$ , and  $m\angle YXZ = 4y + 13$ .
15. Make a conjecture given that  $m\angle A = m\angle B$  and  $m\angle B = m\angle C$ .
16. If  $\overline{AB} \parallel \overline{CD}$  and  $\overline{BD} \parallel \overline{AC}$ , then  $ABDC$  is a rectangle. Find a counterexample.
17. Find the length of  $\overline{LM}$  if  $\overline{ON}$  is the bisector of  $\overline{LM}$  and  $LN = 3x + 2$ .



18. Write the statement *An elephant is a mammal* in if-then form.
19. Write the contrapositive of the statement *If two angles are supplements of the same angle, then they are congruent.*
20. Name the theorem that can be used to state that  $\overline{AB} \cong \overline{BC}$ ,  $\overline{AD} \cong \overline{DB}$ , and  $\overline{BE} \cong \overline{EC}$  given  $B$  is the midpoint of  $\overline{AC}$ ,  $D$  the midpoint of  $\overline{AB}$ , and  $E$  the midpoint of  $\overline{BC}$ .



**Complete the proofs below by supplying the reasons for each location.**

**Given:**  $3 - 2(4 - x) = 11 + 6x$

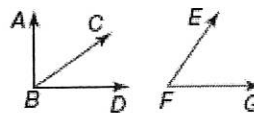
**Prove:**  $x = -4$

**Proof:**

Statements	Reasons
1. $3 - 2(4 - x) = 11 + 6x$	1. Given
2. $3 - 8 + 2x = 11 + 6x$	2. (Exercise a.)
3. $-5 + 2x = 11 + 6x$	3. Addition of like terms
4. $2x = 16 + 6x$	4. (Exercise b.)
5. $-4x = 16$	5. Subtraction Property
6. $x = -4$	6. Division Property

**Given:**

$\overline{AB} \perp \overline{BD}$   
 $\angle EFG$  and  $\angle CBD$  are complementary.  
 $\angle EFG \cong \angle ABC$



**Prove:**

**Proof:**

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Statements	Reasons
1. $\overline{AE} \perp \overline{BD}$	1. Given
2. $\angle EFG$ and $\angle CBD$ are complementary.	2. Given
3. $\angle ABD$ is a right angle.	3. Perpendicular lines form right angles.
4. $m\angle ABD = 90$	4. Def. of right angle
5. $m\angle ABC + m\angle CBD = m\angle ABD$	5. (Exercise c.)
6. $m\angle ABC + m\angle CBD = 90$	6. Substitution
7. $\angle ABC$ and $\angle CBD$ are complementary.	7. Def. of complementary $\triangle$
8. $\angle EFG \cong \angle ABC$	8. (Exercise d.)

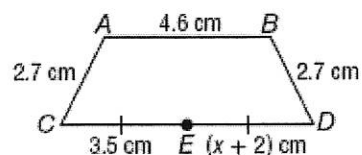
- 21. Supply reason for 2. (exercise a.) above.
- 22. Supply reason for 4. (exercise b.) above.
- 23. Supply reason for 5. (exercise c.) above.
- 24. Supply reason for 8. (exercise d.) above.

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

25. If  $\overline{AB} \cong \overline{CD}$ , then  $AB + EF = CD + EF$ .

Indicate the answer choice that best completes the statement or answers the question.

Use the figure.



- 26. Points A, B, and D \_\_\_\_\_ .
  - a. are collinear      b. are coplanar
  - c. lie on AD          d. contain C
- 27. Which segments are congruent?
  - a.  $\overline{AB}$  and  $\overline{ED}$       b.  $\overline{AC}$  and  $\overline{ED}$
  - c.  $\overline{AC}$  and  $\overline{BD}$       d.  $\overline{AB}$  and  $\overline{BD}$

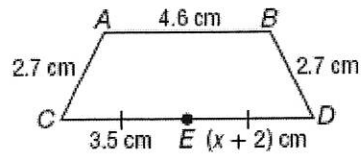
Name the definition, property, postulate, or theorem that justifies each statement.

28. If  $\overline{AB} \cong \overline{XY}$ , then  $\overline{XY} \cong \overline{AB}$ .

Indicate the answer choice that best completes the statement or answers the question.

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Use the figure.



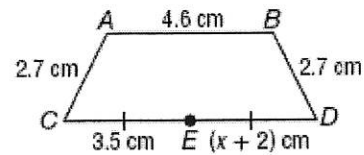
29. Find the value of  $x$ .

- a. 1      b. 1.5
- c. 2      d. 2.7

30. Draw a triangular prism and label the parallel planes  $ABC$  and  $DEF$ .

*Indicate the answer choice that best completes the statement or answers the question.*

Use the figure.

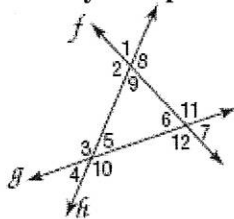


31. Classify  $\angle C$ .

- a. right angle      b. acute angle
- c. obtuse angle      d. straight angle

32. Name two lines in your triangular prism that are skew.

Identify each pair of angles as *alternate interior*, *alternate exterior*, *corresponding*, or *consecutive interior angles*.



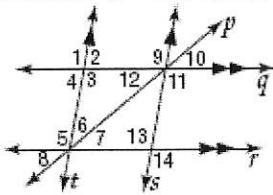
33.  $\angle 9$  and  $\angle 12$

34.  $\angle 2$  and  $\angle 3$

35.  $\angle 4$  and  $\angle 11$

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36. If  $m\angle 9 = 110$  and  $m\angle 8 = 30$ , find  $m\angle 6$ .



Determine the slope of the line that contains the given points.

37.  $D(-6, -7), F(12, 23)$

Determine whether  $\overleftrightarrow{QV}$  and  $\overleftrightarrow{RM}$  are parallel, perpendicular, or neither.

38.  $Q(-3, -8), V(5, 12), R(-2.5, 1), M(-5, 2)$

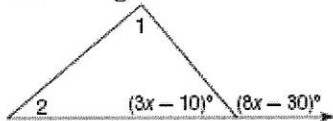
39.  $Q(-2, 4.5), V(4, 9), R(-4, -12), M(10, -1.5)$

40. If  $\triangle ABC$  is isosceles,  $\angle B$  is the vertex angle,  $AB = 20x - 2$ ,  $BC = 12x + 30$ , and  $AC = 25x$ , find  $x$  and the length of each side of the triangle.

41. Find the length of the sides of the triangle with vertices  $A(0, 4), B(5, 4)$ , and  $C(-3, -2)$ . Classify the triangle by its sides and angles.

42. Write an equation of the line that is perpendicular to  $3x - 4y = 9$  and contains  $(-4, -5)$ .

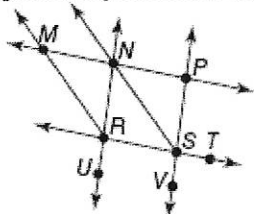
Use the figure below to answer the following questions.



43. Find the value of  $x$ .

44. Find  $m\angle 1$ , if  $m\angle 1 = 4x + 10$ .

Given the following information, determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.

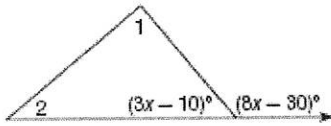


45.  $\angle RNS \cong \angle PSN$

46.  $m\angle MRS + m\angle RSN = 180$

Use the figure below to answer the following questions.

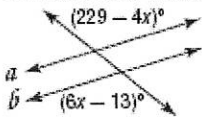
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47. Find  $m\angle 2$ .

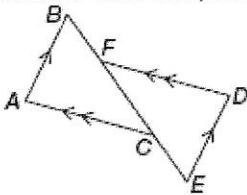
48. The vertices of  $\triangle ABC$  are  $A(-1, 1)$ ,  $B(4, 2)$ , and  $C(1, 5)$ . The vertices of  $\triangle DEF$  are  $D(-1, -1)$ ,  $E(4, -2)$ , and  $F(1, -5)$  so that  $\triangle ABC \cong \triangle DEF$ . Identify the congruence transformation.

49. Find the value of  $x$  so that  $a \parallel b$ .

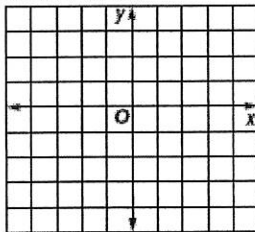


50. Determine whether  $\triangle GHI \cong \triangle JKL$ , given  $G(1, 2)$ ,  $H(5, 4)$ ,  $I(3, 6)$  and  $J(-4, -5)$ ,  $K(0, -3)$ ,  $L(-2, -1)$ . Explain.

51. In the figure,  $\overline{AC} \cong \overline{FD}$ ,  $\overline{AB} \parallel \overline{DE}$ , and  $\overline{AC} \parallel \overline{FD}$ . Determine which postulate can be used to prove  $\triangle ABC \cong \triangle DEF$ . Choose from SSS, SAS, ASA, and AAS.

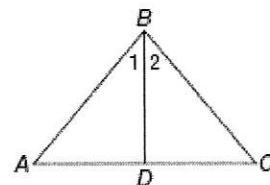


52. Graph line  $m$  whose equation is  $-6x - 3y = 9$ . Construct a perpendicular line through  $P(3, 1)$ . Then find the distance from  $P$  to  $m$ .



Complete this two-column proof.

**Given:**  $\triangle ABC$  is an isosceles triangle with base  $\overline{AC}$ .  $D$  is the midpoint of  $\overline{AC}$ .  
**Prove:**  $\overline{BD}$  bisects  $\angle ABC$



Statements	Reasons
1. $\triangle ABC$ is isosceles with base $\overline{AC}$ .	1. Given
2. $\overline{AB} \cong \overline{CB}$	2. Def. of isosceles triangle.
3. $\angle A \cong \angle C$	3. (_____)
4. $D$ is the midpoint of $\overline{AC}$ .	4. Given

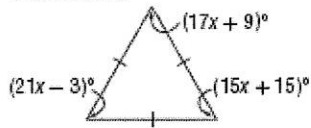
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- |                                         |                           |
|-----------------------------------------|---------------------------|
| 5. $\overline{AD} \cong \overline{CD}$  | 5. Midpoint Theorem       |
| 6. $\triangle ABD \cong \triangle CBD$  | 6. (_____)                |
| 7. $\angle 1 \cong \angle 2$            | 7. CPCTC                  |
| 8. $\overline{BD}$ bisects $\angle ABC$ | 8. Def. of angle bisector |

53. Complete **3.** in the Reasons column.

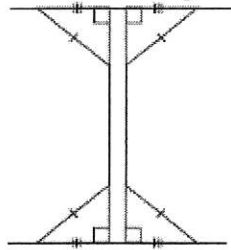
54. Complete **6.** in the Reasons column.

55. Find  $x$ .

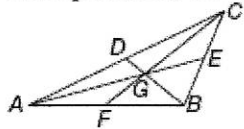


56. Position and label isosceles  $\triangle ABC$  with base  $\overline{AB}$ ,  $(a + b)$  units long, on a coordinate plane

57. A wood column is supported by four cables that form four triangles. Determine which postulate can be used to show that all the triangles are congruent.

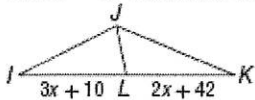


58. If point  $G$  is the centroid of  $\triangle ABC$ ,  $AE = 24$ ,  $DG = 5$ , and  $CG = 14$ , find  $DB$ .

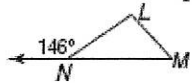


59. The vertices of  $\triangle EFG$  are  $E(2, 4)$ ,  $F(10, -6)$ , and  $G(-4, -8)$ . Find the coordinates of the orthocenter of  $\triangle EFG$ .

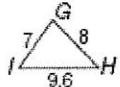
60. If  $\overline{JL}$  is a median for  $\triangle IJK$ , find the value of  $x$ .



61. Write a compound inequality for the possible measures of  $\angle L$ .

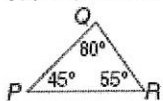


62. List the angles of  $\triangle GHI$  in order from smallest to largest measure.

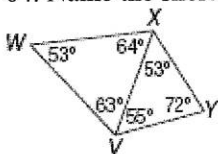


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63. List the sides of  $\triangle PQR$  in order from shortest to longest.



64. Name the shortest and the longest segments.

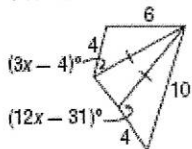


65. Write the assumption you would make to begin an indirect proof of the statement. *If  $2x + 6 = 12$ , then  $x = 3$ .*

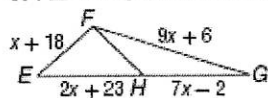
66. Determine whether 8, 4, and 2 can be the lengths of the sides of a triangle. Write *yes* or *no*. Explain.

67. Write the assumption you would make to begin an indirect proof of the statement. *The three angle bisectors of a triangle are concurrent.*

68. Write and solve an inequality for  $x$ .

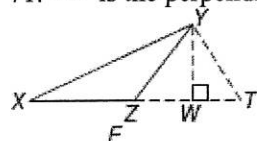


69. If  $\overline{FH}$  is a median of  $\triangle EFG$ , find the perimeter of  $\triangle EFG$ .

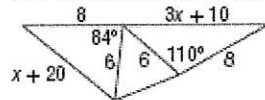


70. The measures of two sides of a triangle are 24 inches and 29 inches. If the measure of the third side is  $x$  inches, find the range for the value of  $x$ .

71.  $\overline{YW}$  is the perpendicular bisector of  $\overline{ZT}$ . If  $TW = 3$ ,  $YW = 8$ , and  $XZ = 12$ . Find  $XY$ .



72. Write and solve an inequality for the value of  $x$ .



**Complete the proof below by supplying the missing information for each corresponding location.**

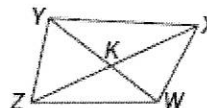
**Given:**

$XW = YZ, XK > WK, \text{ and } KZ > KY$

**Prove:**

$m\angle XWZ > m\angle YZW$

**Proof:**





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Statements	Reasons
1. $XW = YZ$ , $XK > WK$ , and $KZ > KY$	1. Given
2. $\overline{XW} \cong \overline{YZ}$	2. (_____)
3. $XZ > WY$	3. (_____)
4. $\overline{WZ} \cong \overline{WZ}$	4. (_____)
5. $m\angle XWZ > m\angle YZW$	5. (_____)

73. Complete 2. from the Reasons column.

74. Complete 3. from the Reasons column.

75. Complete 4. from the Reasons column.

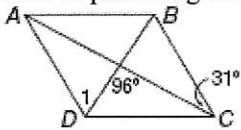
76. Complete 5. from the Reasons column.

77. The sum of the interior angles of an animal pen is  $900^\circ$ . How many sides does the pen have?

78. A convex hexagon has interior angles with measures  $x^\circ$ ,  $(5x - 103)^\circ$ ,  $(2x + 60)^\circ$ ,  $(7x - 31)^\circ$ ,  $(6x - 6)^\circ$ , and  $(9x - 100)^\circ$ . Find the value of  $x$  and the measure of each angle.

79. Find the measure of each exterior angle of a regular  $2x$ -gon.

80. For parallelogram  $ABCD$ , find  $m\angle 1$ .

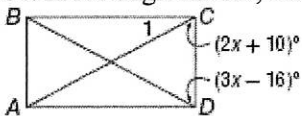


81.  $ABCD$  is a parallelogram with diagonals that intersect each other at  $E$ . If  $AE = x^2$  and  $EC = 6x - 8$ , find all possible values of  $AC$ .

82. Determine whether the quadrilateral is a parallelogram. Justify your answer.

83. For quadrilateral  $ABCD$ , the slope of  $\overline{AB}$  is  $\frac{2}{3}$  and the slope of  $\overline{BC}$  is  $-2$ . Find the slopes of  $\overline{CD}$  and  $\overline{DA}$  so that  $ABCD$  will be a parallelogram.

84. In rectangle  $ABCD$ , find  $m\angle 1$ .

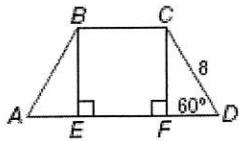


85. The diagonals of rhombus  $ABCD$  intersect at  $E$ . If  $m\angle BAE = \frac{2}{3}(m\angle ABE)$ , find  $m\angle BCD$ .

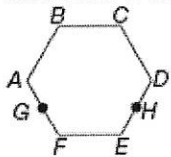
86. The diagonals of square  $ABCD$  intersect at  $E$ . If  $AE = 2$ , find the perimeter of  $ABCD$ .

87. For isosceles trapezoid  $ABCD$ , find  $AE$ .

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88. Points  $G$  and  $H$  are midpoints of  $\overline{AF}$  and  $\overline{DE}$  in regular hexagon  $ABCDEF$ . If  $AB = 6$ , find  $GH$ .



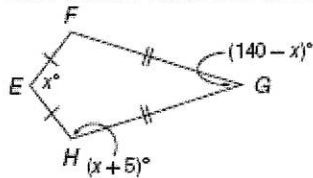
89. The vertices of trapezoid  $ABCD$  are  $A(10, -1)$ ,  $B(6, 6)$ ,  $C(-2, 6)$ , and  $D(-8, -1)$ . Find the length of the median.

90. Determine whether the quadrilateral  $ABCD$  with vertices  $A(0, -1)$ ,  $B(-4, -3)$ ,  $C(-5, 1)$ ,  $D(1, 7)$  is a kite. Justify your answer.

91. Determine whether the quadrilateral  $ABCD$  with vertices  $A(6, 2)$ ,  $B(2, 10)$ ,  $C(-6, 6)$ , and  $D(-2, -2)$  is a rectangle. Justify your answer.

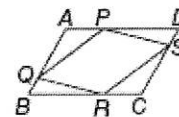
92. Determine whether quadrilateral  $ABCD$  with vertices  $A(1, 6)$ ,  $B(7, 6)$ ,  $C(2, -3)$ , and  $D(-4, -3)$  is a parallelogram. Use the distance formula.

93. Find the value of  $x$  in kite  $EFGH$ .



**Complete the two-column proof by supplying the missing information for each corresponding location.**

**Given:**  $ABCD$  is a parallelogram.  
 $\overline{BQ} \cong \overline{DS}$ ,  $\overline{PA} \cong \overline{RC}$   
**Prove:**  $PQRS$  is a parallelogram.



Statements	Reasons
1. $ABCD$ is a $\square$ .	1. Given
2. $\overline{AD} \cong \overline{CB}$	2. (_____)
3. $\overline{PA} \cong \overline{RC}$	3. Given
4. $\overline{PD} \cong \overline{RB}$	4. Seg. Sub. Prop.
5. $\overline{AB} \cong \overline{CD}$	5. Opp. sides of a $\square$ are $\cong$ .
6. $\overline{BQ} \cong \overline{DS}$	6. Given
7. $\overline{AQ} \cong \overline{CS}$	7. Seg. Sub. Prop.
8. $\angle B \cong \angle D$ , $\angle A \cong \angle C$	8. Opp. $\angle$ of a $\square$ are $\cong$ .
9. $\triangle QBR \cong \triangle SDP$ , $\triangle PAQ \cong \triangle RCS$	9. SAS
10. $\overline{QP} \cong \overline{RS}$ , $\overline{QR} \cong \overline{PS}$	10. CPCTC
11. $PQRS$ is a parallelogram.	11. (_____)

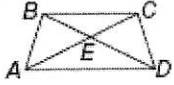
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**Geometry Honors Semester 1 Exam Review**

94. Complete **2.** from the Reasons column.

95. Complete **11.** from the Reasons column.

96. In isosceles trapezoid  $ABCD$ ,  $AE = 2x + 5$ ,  $EC = 3x - 12$ , and  $BD = 4x + 20$ . Find the value of  $x$ .



97. If three of the interior angles of a convex hexagon each measure 140, a fourth angle measures 84, and the measure of the fifth angle is 3 times the measure of the sixth angle, find the measure of the sixth angle.

*Enter the appropriate word(s) to complete the statement.*

- |                     |                           |           |
|---------------------|---------------------------|-----------|
| base                | legs                      | rhombus   |
| base angle          | midsegment of a trapezoid | square    |
| diagonal            | parallelogram             | trapezoid |
| isosceles trapezoid | rectangle                 |           |

**Choose from the terms above to complete each sentence.**

98. A quadrilateral with only one pair of opposite sides parallel and the other pair of opposite sides congruent is a(n) \_\_\_\_\_.

99. A quadrilateral that is both a rectangle and a rhombus is a(n) \_\_\_\_\_.

*Indicate the answer choice that best completes the statement or answers the question.*

**Choose the correct term to complete each sentence.**

100. The segment joining the midpoints of the nonparallel sides of a trapezoid is called the \_\_\_\_\_.  
a. median      b. diagonal

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**Answer Key**

1. planes  $ABCD$ ,  $BFCE$ ,  $FBA$ ,  $CDE$ , and plane  $P$  or  $ADEF$
2.  $\overleftrightarrow{DC}$  or  $\overleftrightarrow{BC}$
3.  $-1$
4. 12.3 cm and 19.3 cm
5. 6
6. 8
7.  $\sqrt{20}$  or  $2\sqrt{5} \approx 4.5$
8. 4 units<sup>2</sup>
9.  $A$ ,  $B$ , and  $D$
10. 3
11.  $15.5 > x > 8$
12. 27
13. 36
14. 8
15.  $m\angle A = m\angle C$
16.  $ABDC$  is a parallelogram or a rhombus.
17. 8.5
18. If an animal is an elephant, then it is a mammal.
19. If two  $\sphericalangle$ s are not  $\cong$ , then they are not supplements of the same  $\sphericalangle$ .
20. Midpoint Theorem
21. Distributive Property
22. Addition Property
23.  $\sphericalangle$  Addition Postulate
24. Complements of the same angle are  $\cong$ .

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25. Seg. Addition Post.

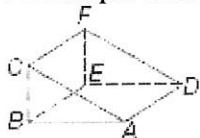
26. b

27. c

28. Symmetric Prop.

29. b

30. Sample answer:



31. b

32. Sample answer:  $\overleftrightarrow{AD}$  is skew to  $\overleftrightarrow{EF}$ .

33. corresponding

34. consecutive interior

35. alternate exterior

36. 40

37.  $\frac{5}{3}$

38. perpendicular

39. parallel

40.  $x = 4, AB = BC = 78, AC = 100$

41.  $AB = 5, BC = 10, AC = 3\sqrt{5}$ ; scalene obtuse

42.  $y = -\frac{4}{3}x - \frac{31}{3}$

43. 20

44. 90

45.  $\overleftrightarrow{NU} \parallel \overleftrightarrow{PV}$ ; Alt. Int.  $\sphericalangle$  Th.

46.  $\overleftrightarrow{MR} \parallel \overleftrightarrow{NS}$ ; Cons. Int.  $\sphericalangle$  Th.

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47. 40

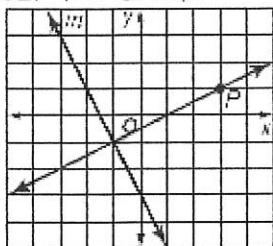
48. reflection

49. 24.2

50.  $GH = JK = 2\sqrt{5}$ ,  $IG = LJ = 2\sqrt{5}$ ,  $IH = LK = 2\sqrt{2}$ ;  $\triangle GHI \cong \triangle JKL$  by SSS.

51. AAS

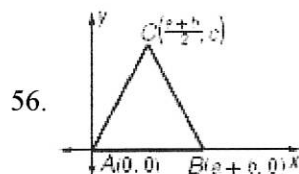
52.  $\sqrt{20}$  or  $2\sqrt{5}$



53. Isosceles Triangle Theorem

54. SAS

55.  $x = 3$



57. Hypotenuse-leg congruence for right  $\triangle$ s

58. 15

59.  $\left(\frac{38}{13}, -\frac{32}{13}\right)$

60. 32

61.  $146 > m\angle L > 0$

62.  $\angle H, \angle I, \angle G$

63.  $\overline{QR}, \overline{PQ}, \overline{PR}$

64. shortest:  $\overline{VY}$ ; longest:  $\overline{VW}$

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65.  $x \neq 3$

66. no;  $2 + 4 < 8$

67. The  $\angle$  bisectors are not concurrent.

68.  $12x - 31 > 3x - 4$ ;  $x > 3$

69. 140

70. 5 in.  $< x < 53$  in.

71. 17

72.  $3x + 10 > x + 20$ ;  $x > 5$

73. Def. of  $\cong$  segments

74. Addition Prop. Of Inequality

75. Reflexive Prop.

76. Converse of Hinge Th.

77. 7

78. 30; 30, 47, 120, 179, 174, and 170

79.  $\frac{180}{x}$

80. 65

81. 8 or 32

82. Yes; the diagonals bisect each other.

83. slope of  $\overline{CD} = \frac{2}{3}$ ; slope of  $\overline{DA} = -2$ .

84. 28

85. 72

86.  $8\sqrt{2}$

87. 4

88. 9

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9. 13

90. No; two pairs of congruent consecutive sides do not exist.  $CD = \sqrt{72}$ ,  $DA = \sqrt{65}$ ,  $AB = \sqrt{20}$ ,  $BC = \sqrt{17}$ 91. Yes:  $\overline{AB} \perp \overline{BC}$ ,  $\overline{BC} \perp \overline{CD}$ ,  $\overline{CD} \perp \overline{AD}$  so opp.  $\angle$  are  $\cong$ , all  $\angle$  are rt.  $\angle$ .92.  $ABCD$  has 2 pairs of opp. sides  $\cong$ ,  $\overline{AB} \cong \overline{CD}$  and  $\overline{BC} \cong \overline{DA}$ , so  $ABCD$  is a  $\square$ .

93. 105

94. Opp. sides of a  $\square$  are  $\cong$ .95. If both pairs of opp. sides of a quad. are  $\cong$ , then the quad. is a  $\square$ .

96. 27

97. 54

98. isosceles trapezoid

99. square

100. a