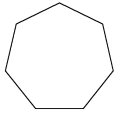


Final Review Geometry part I

1. Find the sum of the measures of the angles of the figure.



- a. 900 b. 1080 c. 1620 d. 1260

2. What is the sum of the angle measures of a 36-gon?

- a. 6480 b. 6300 c. 6840 d. 6120

3. The sum of the angle measures of a polygon with s sides is 2520. Find s .

- a. 14 b. 16 c. 18 d. 15

4. The Polygon Angle-Sum Theorem states: The sum of the measures of the angles of an n -gon is _____.

- a. $\frac{n-2}{180}$ b. $(n-1)180$ c. $\frac{180}{n-1}$ d. $(n-2)180$

5. Complete this statement: A polygon with all sides the same length is said to be _____.

- a. regular b. equilateral c. equiangular d. convex

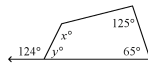
6. What is the measure of one angle in a regular 25-gon?

- a. 194.4 b. 4140 c. 165.6 d. 82.8

7. A road sign is in the shape of a regular heptagon. What is the measure of each angle on the sign? Round to the nearest tenth.

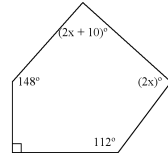
- a. 900 b. 231.4 c. 128.6 d. 64.3

8. Find the missing values of the variables. The diagram is not to scale.



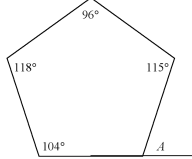
- a. $x = 124, y = 125$ b. $x = 56, y = 114$ c. $x = 114, y = 56$ d. $x = 56, y = 124$

9. Find the value of x . The diagram is not to scale.



- a. 90 b. 35 c. 100 d. 45

10. Find $m\angle A$. The diagram is not to scale.



- a. 107 b. 117 c. 63 d. 73

11. The sum of the measures of two exterior angles of a triangle is 255. What is the measure of the third exterior angle?

- a. 75 b. 115 c. 105 d. 95

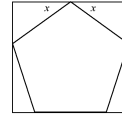
12. How many sides does a regular polygon have if each exterior angle measures 20?

- a. 17 sides b. 20 sides c. 21 sides d. 18 sides

13. Complete this statement: The sum of the measures of the exterior angles of an n -gon, one at each vertex, is _____.

- a. $(n-2)180$ b. 360 c. $\frac{(n-2)180}{n}$ d. 180n

14. This jewelry box has the shape of a regular pentagon. It is packaged in a rectangular box as shown here. The box uses two pairs of congruent right triangles made of foam to fill its four corners. Find the measure of the foam angle marked.



- a. 18° b. 54° c. 36° d. 72°

15. Use *less than, equal to, or greater than* to complete this statement: The measure of each exterior angle of a regular 7-gon is _____ the measure of each exterior angle of a regular 5-gon.

- a. cannot tell b. equal to c. less than d. greater than

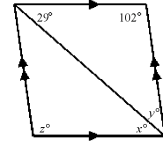
16. Use *less than, equal to, or greater than* to complete this statement: The sum of the measures of the exterior angles of a regular 5-gon, one at each vertex, is _____ the sum of the measures of the exterior angles of a regular 9-gon, one at each vertex.

- a. greater than b. cannot tell c. equal to d. less than

17. A nonregular hexagon has five exterior angle measures of 55, 60, 69, 57, and 57. What is the measure of the interior angle adjacent to the sixth exterior angle?

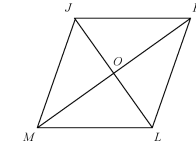
- a. 128 b. 118 c. 62 d. 108

18. Find the values of the variables in the parallelogram. The diagram is not to scale.



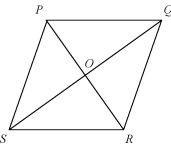
- a. $x = 49, y = 29, z = 102$ b. $x = 29, y = 49, z = 131$ c. $x = 49, y = 49, z = 131$ d. $x = 29, y = 49, z = 102$

19. In the parallelogram, $m\angle KLO = 69$ and $m\angle MLO = 47$. Find $m\angle KJM$. The diagram is not to scale.



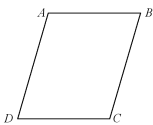
- a. 69 b. 106 c. 116 d. 64

20. In the parallelogram, $m\angle QRP = 46$ and $m\angle PRS = 50$. Find $m\angle PQR$. The diagram is not to scale.



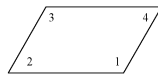
- a. 46 b. 84 c. 50 d. 96

21. $ABCD$ is a parallelogram. If $m\angle CDA = 66$, then $m\angle BCD = ?$. The diagram is not to scale.



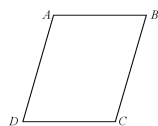
- a. 66 b. 124 c. 114 d. 132

22. For the parallelogram, if $m\angle 2 = 5x - 28$ and $m\angle 4 = 3x - 10$, find $m\angle 3$. The diagram is not to scale.



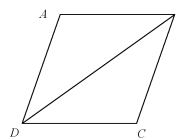
- a. 9 b. 17 c. 173 d. 163

23. $ABCD$ is a parallelogram. If $m\angle DAB = 115$, then $m\angle BCD = ?$. The diagram is not to scale.



- a. 125 b. 65 c. 75 d. 115

24. What is the missing reason in the proof?
Given: $\square ABCD$ with diagonal BD
Prove: $\triangle ABD \cong \triangle CDB$

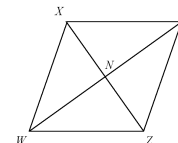


Statements	Reasons
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- | | |
|--|--------------------------------------|
| 1. $AD \parallel BC$ | 1. Definition of parallelogram |
| 2. $\angle ADB = \angle CBD$ | 2. Alternate Interior Angles Theorem |
| 3. $AB \parallel CD$ | 3. ? |
| 4. $\angle ABD = \angle CDB$ | 4. Alternate Interior Angles Theorem |
| 5. $DB = DB$ | 5. Reflexive Property of Congruence |
| 6. $\triangle ABD \cong \triangle CDB$ | 6. ASA |

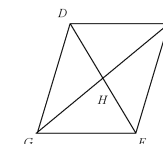
- a. Reflexive Property of Congruence b. Definition of parallelogram
c. Alternate Interior Angles Theorem d. ASA

25. $WXYZ$ is a parallelogram. Name an angle congruent to $\angle WZY$.



- a. $\angle ZXY$ b. $\angle XWZ$ c. $\angle ZXW$ d. $\angle WXY$

26. In parallelogram $DEFG$, $DH = x + 3$, $HF = 3y$, $GH = 4x - 5$, and $HE = 2y + 3$. Find the values of x and y . The diagram is not to scale.

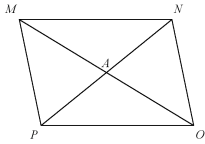


- a. $x = 6, y = 3$ b. $x = 2, y = 3$ c. $x = 3, y = 2$ d. $x = 3, y = 6$

Name: _____

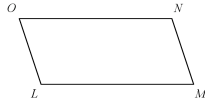
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27. Find AM in the parallelogram if $PN=10$ and $AO=5$. The diagram is not to scale.



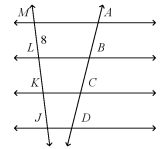
- a. 5 b. 10 c. 5 d. 10

28. $LMNO$ is a parallelogram. If $NM=x+15$ and $OL=3x+5$, find the value of x and then find NM and OL .



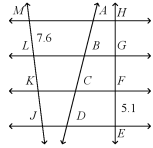
- a. $x=7, NM=20, OL=22$ b. $x=5, NM=20, OL=20$ c. $x=7, NM=22, OL=22$ d. $x=5, NM=22, OL=20$

29. In the figure, the horizontal lines are parallel and $AB=BC=CD$. Find AM . The diagram is not to scale.



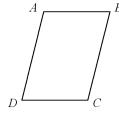
- a. 16 b. 32 c. 8 d. 24

30. In the figure, the horizontal lines are parallel and $AB=BC=CD$. Find KL and FG . The diagram is not to scale.



- a. $KL=7.6, FG=7.6$ b. $KL=5.1, FG=7.6$ c. $KL=5.1, FG=5.1$ d. $KL=7.6, FG=5.1$

31. If $m\angle B = m\angle D = 39$, find $m\angle C$ so that quadrilateral $ABCD$ is a parallelogram. The diagram is not to scale.

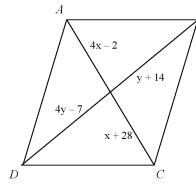


- a. 39 b. 282 c. 141 d. 78

Name: _____

ID: A

32. Find values of x and y for which $ABCD$ must be a parallelogram. The diagram is not to scale.



- a. $x=10, y=38$ b. $x=10, y=21$ c. $x=10, y=7$ d. $x=7, y=10$

33. If $ON=5x-4, LM=4x+7, NM=x-7$, and $OL=2y-6$, find the values of x and y for which $LMNO$ must be a parallelogram. The diagram is not to scale.



- a. $x=4, y=5$ b. $x=4, y=1/5$ c. $x=11, y=1/5$ d. $x=11, y=5$

34. Based on the information in the diagram, can you prove that the figure is a parallelogram? Explain.



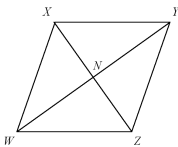
- a. Yes; both pairs of opposite sides are congruent. b. Yes; opposite angles are congruent. c. No; you cannot prove that the quadrilateral is a parallelogram. d. Yes; two opposite sides are both parallel and congruent.

Name: _____

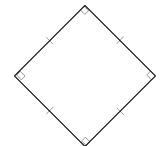
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35. Based on the information given, can you determine that the quadrilateral must be a parallelogram? Explain.

Given: $\overline{XY} \cong \overline{WZ}$ and $\overline{XW} \cong \overline{YZ}$



- a. Yes; opposite sides are congruent. b. Yes; diagonals of a parallelogram bisect each other. c. Yes; two opposite sides are both parallel and congruent. d. No; you cannot determine that the quadrilateral is a parallelogram.
36. Which description does NOT guarantee that a quadrilateral is a square?
 a. is both a rectangle and a rhombus b. is a parallelogram with perpendicular diagonals
 c. has all sides congruent and all angles congruent d. has all right angles and has all sides congruent
37. What is the most precise name for quadrilateral $ABCD$ with vertices $A(-2, 2), B(0, 4), C(6, 4)$, and $D(4, 2)$?
 a. rectangle b. parallelogram c. quadrilateral d. rhombus
38. Classify the figure in as many ways as possible.

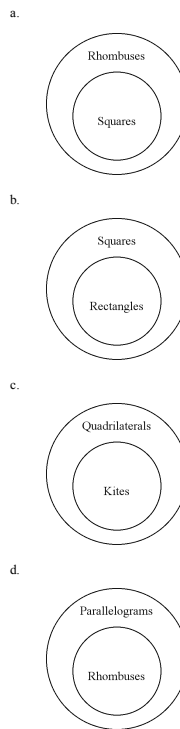


- a. rectangle, square, quadrilateral, parallelogram, rhombus b. rectangle, square, parallelogram
 c. rhombus, quadrilateral, square d. square, rectangle, quadrilateral

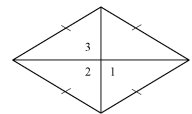
39. Which statement is true?
 a. All quadrilaterals are rectangles. b. All quadrilaterals are squares. c. All rectangles are quadrilaterals. d. All quadrilaterals are parallelograms.
40. Which Venn diagram is NOT correct?

Name: _____

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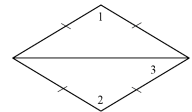


41. In the rhombus, $m\angle 1 = 18x, m\angle 2 = x+y$, and $m\angle 3 = 30z$. Find the value of each variable. The diagram is not to scale.



- a. $x=10, y=85, z=6$ b. $x=5, y=175, z=6$ c. $x=5, y=85, z=3$ d. $x=10, y=175, z=3$

42. In the rhombus, $m\angle 1 = 106$. What are $m\angle 2$ and $m\angle 3$? The diagram is not to scale.

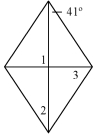


- a. $m\angle 2 = 106, m\angle 3 = 53$
 b. $m\angle 2 = 74, m\angle 3 = 37$
 c. $m\angle 2 = 106, m\angle 3 = 37$
 d. $m\angle 2 = 74, m\angle 3 = 53$

Name: _____

ID: A

43. Find the measure of the numbered angles in the rhombus. The diagram is not to scale.

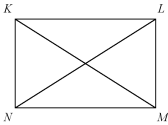


- a. $m\angle 1 = 90$, $m\angle 2 = 41$, and $m\angle 3 = 41$
 b. $m\angle 1 = 90$, $m\angle 2 = 41$, and $m\angle 3 = 69.5$
 c. $m\angle 1 = 90$, $m\angle 2 = 49$, and $m\angle 3 = 41$
 d. $m\angle 1 = 90$, $m\angle 2 = 41$, and $m\angle 3 = 49$

44. $DEFG$ is a rectangle. $DF = 5x - 5$ and $EG = x + 11$. Find the value of x and the length of each diagonal.

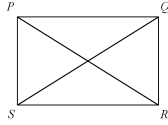
- a. $x = 4$, $DF = 13$, $EG = 13$ b. $x = 4$, $DF = 15$, $EG = 18$ c. $x = 4$, $DF = 15$, $EG = 15$ d. $x = 2$, $DF = 13$, $EG = 13$

45. In rectangle $KL MN$, $KM = 6x + 16$ and $LN = 49$. Find the value of x .



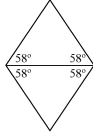
- a. 5.5 b. 4.5 c. 33 d. 6.5

46. In rectangle $PQRS$, $PR = 18x - 24$ and $QS = x + 146$. Find the value of x and the length of each diagonal.



- a. $x = 10$, $PR = 156$, $QS = 156$ b. $x = 10$, $PR = 78$, $QS = 78$ c. $x = 5$, $PR = 151$, $QS = 151$ d. $x = 11$, $PR = 174$, $QS = 174$

47. Parallelogram $ABCD$ has the angle measures shown. Can you conclude that it is a rhombus, a rectangle, or a square? Explain.

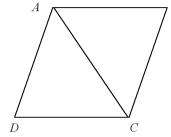


- a. Parallelogram $ABCD$ is a rhombus, because the diagonal bisects two angles.
 b. Parallelogram $ABCD$ is a square, because all four angles have the same measure.
 c. Parallelogram $ABCD$ is a rectangle, because the diagonal creates congruent angles.
 d. There is not enough information.

Name: _____

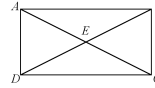
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48. In quadrilateral $ABCD$, $m\angle ACD = 2x + 4$ and $m\angle ACB = 5x - 11$. For what value of x is $ABCD$ a rhombus?



- a. 4 b. 5 c. 6 d. 7

49. In quadrilateral $ABCD$, $AE = x + 10$ and $BE = 3x - 18$. For what value of x is $ABCD$ a rectangle?

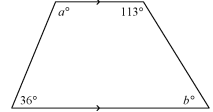


- a. 24 b. 14 c. 18 d. 16

50. Lucinda wants to build a square sandbox, but she has no way of measuring angles. Explain how she can make sure that the sandbox is square by only measuring length.

- a. Arrange four equal-length sides so the diagonals bisect each other. b. Arrange four equal-length sides so the diagonals are equal lengths also. c. Make each diagonal the same length as four equal-length sides. d. Not possible; Lucinda has to be able to measure a right angle.

51. Find the values of a and b . The diagram is not to scale.



- a. $a = 144$, $b = 67$ b. $a = 144$, $b = 36$
 c. $a = 113$, $b = 67$ d. $a = 113$, $b = 36$

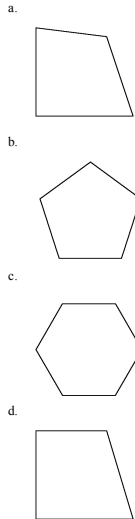
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52. Judging by appearances, which figure is a trapezoid?



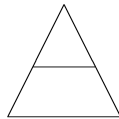
53. In quadrilateral $MNOP$, $\angle M = \angle N$. Which of a parallelogram, trapezoid, or rhombus could quadrilateral $MNOP$ be?

- a. parallelogram or rhombus b. parallelogram only c. trapezoid only d. any of the three

54. $\angle J$ and $\angle M$ are base angles of isosceles trapezoid $JKLM$. If $m\angle J = 20x + 9$, and $m\angle M = 14x + 15$, find $m\angle K$.

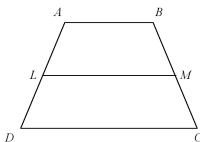
- a. 151 b. 1 c. 29 d. 75.5

55. The isosceles trapezoid is part of an isosceles triangle with a 46° vertex angle. What is the measure of an acute base angle of the trapezoid? Of an obtuse base angle? The diagram is not to scale.



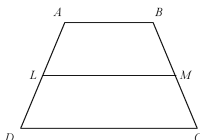
- a. 67° ; 134° b. 67° ; 113° c. 46° ; 134°
 d. 46° ; 113°

56. \overline{LM} is the midsegment of $\square ABCD$. $AB = 46$ and $DC = 125$. What is LM ?



- a. 171 b. 85.5 c. 79 d. 95.5

57. \overline{LM} is the midsegment of $\square ABCD$. $AB = x + 8$, $LM = 4x + 3$, and $DC = 201$. What is the value of x ?

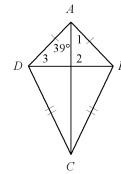


- a. 33 b. 29 c. 238 d. 37

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58. Find $m\angle 1$ and $m\angle 3$ in the kite. The diagram is not to scale.

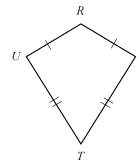


- a. 51, 51 b. 39, 39 c. 39, 51 d. 51, 39

59. Which description does NOT guarantee that a quadrilateral is a kite?

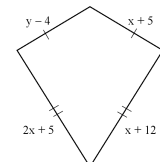
- a. one diagonal bisects opposite angles and the other diagonal does not b. two distinct pairs of congruent adjacent sides c. perpendicular diagonals d. perpendicular diagonals, exactly one of which bisects the other

60. $m\angle R = 130$ and $m\angle S = 80$. Find $m\angle T$. The diagram is not to scale.



- a. 65 b. 70 c. 35 d. 80

61. Find the values of the variables and the lengths of the sides of this kite.



- a. $x = 7$, $y = 16$; 3, 21 b. $x = 16$, $y = 7$; 12, 12
 c. $x = 7$, $y = 16$; 12, 19 d. $x = 16$, $y = 7$; 3, 21

62. Is $\triangle TJS$ scalene, isosceles, or equilateral? The vertices are $T(1, 1)$, $J(4, 0)$, and $S(3, 5)$.

- a. scalene b. isosceles c. equilateral d. cannot be determined

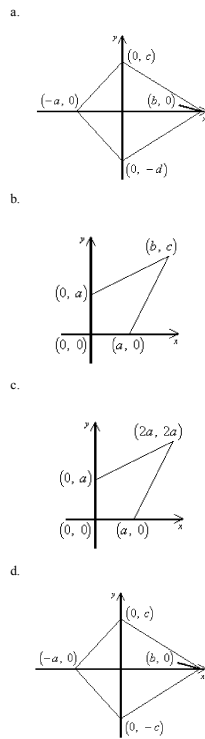
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63. A quadrilateral has vertices $(2, 2)$, $(2, -2)$, $(-1, -2)$, and $(-1, 2)$. What special quadrilateral is formed by connecting the midpoints of the sides?
 a. rhombus b. trapezoid c. rectangle d. kite
64. Which diagram shows the most useful positioning and accurate labeling of a kite in the coordinate plane?



Name: _____

ID: A

65. Which diagram shows the most useful positioning of a square in the first quadrant of a coordinate plane?
 a.
- b.
- c.
- d.
66. In the coordinate plane, three vertices of rectangle HLK are $H(0, 0)$, $L(0, d)$, and $K(e, 0)$. What are the coordinates of point J ?
 a. $(2e, 2d)$ b. (d, e) c. (e, d) d. $(\frac{d}{2}, \frac{e}{2})$

67. The vertices of the trapezoid are the origin along with $A(4a, 4b)$, $B(4c, 4b)$, and $C(4d, 0)$. Find the midpoint of the midsegment of the trapezoid.

 a. $(a + c + d, b)$ b. $(2c, 2b)$ c. $(a + c + d, 2b)$ d. $(2a + 2d, 2b)$
68. For the parallelogram, find coordinates for P without using any new variables.

 a. $(a - c, c)$ b. (c, a) c. $(a + c, b)$ d. (c, b)
69. A model is made of a car. The car is 9 feet long and the model is 6 inches long. What is the ratio of the length of the car to the length of the model?
 a. 18 : 1 b. 1 : 18 c. 9 : 6 d. 6 : 9
70. The Sears Tower in Chicago is 1450 feet high. A model of the tower is 24 inches tall. What is the ratio of the height of the model to the height of the actual Sears Tower?
 a. 1 : 725 b. 725 : 1 c. 12 : 725 d. 725 : 12

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71. The length of a rectangle is $6\frac{1}{2}$ inches and the width is $4\frac{1}{4}$ inches. What is the ratio, using whole numbers, of the length to the width?
 a. 13 : 17 b. 26 : 34 c. 17 : 26 d. 26 : 17
72. Red and grey bricks were used to build a decorative wall. The $\frac{\text{number of red bricks}}{\text{number of grey bricks}}$ was $\frac{5}{2}$. There were 175 bricks used in all. How many red bricks were used?
 a. 25 b. 125 c. 50 d. 35
73. The measure of two complementary angles are in the ratio 1 : 4. What are the degree measures of the two angles?
 a. 45° and 135° b. 23° and 68° c. 36° and 144° d. 18° and 72°

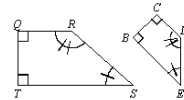
What is the solution of each proportion?

77. $\frac{6}{a} = \frac{18}{27}$
 a. 54 b. 81 c. 9 d. 18
78. $\frac{7}{9} = \frac{m}{27}$
 a. $\frac{1}{21}$ b. 21 c. 3 d. $\frac{7}{3}$
79. $\frac{n-6}{3n} = \frac{n-5}{3n+1}$
 a. -3 b. $\frac{2}{5}$ c. $\frac{9}{17}$ d. 3
80. $\frac{3y-8}{12} = \frac{y}{5}$
 a. -10 b. -7 c. $\frac{3}{40}$ d. $\frac{40}{3}$

Name: _____

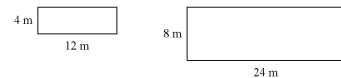
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83. Figure $TQRS \sim BCDE$. What are the pairs of congruent angles?



- a. $\angle R = \angle D$, $\angle Q = \angle E$, $\angle T = \angle B$, and $\angle S = \angle C$
 b. $\angle R = \angle D$, $\angle S = \angle B$, $\angle Q = \angle C$, and $\angle T = \angle E$
 c. $\angle S = \angle D$, $\angle R = \angle D$, $\angle R = \angle E$, $\angle S = \angle E$, $\angle T = \angle B$, and $\angle T = \angle B$, and $\angle Q = \angle C$
 d. $\angle R = \angle D$, $\angle R = \angle E$, $\angle S = \angle E$, $\angle T = \angle B$, and $\angle Q = \angle C$

84. The two rectangles are similar. Which is the correct proportion for corresponding sides?

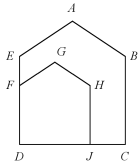


- a. $\frac{12}{8} = \frac{24}{4}$ b. $\frac{12}{4} = \frac{24}{8}$ c. $\frac{12}{4} = \frac{8}{24}$ d. $\frac{4}{12} = \frac{24}{8}$

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85. $ABCDE \sim GHJDF$. Complete the statements.

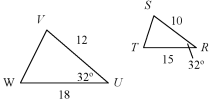


a. $\angle H = \blacksquare$

b. $\frac{GH}{DI} = \frac{AB}{\blacksquare}$

a. $\angle B : \angle C$ b. $E : AE$ c. $E : DC$ d. $\angle B : \angle E$

Are the polygons similar? If they are, write a similarity statement and give the scale factor.



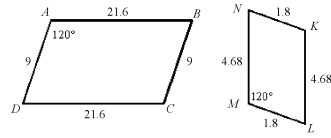
Not drawn to scale.

86. a. $\Delta RST \sim \Delta WUV$; $\frac{5}{6}$ b. $\Delta RST \sim \Delta U'V'$; $\frac{5}{6}$ c. $\Delta RST \sim \Delta VWU$; $\frac{6}{5}$ d. The triangles are not similar.

87. In ΔQRS , $QR = 4$, $RS = 15$, and $m\angle R = 36$. In $\Delta U'V'T$, $U'T = 8$, $TU = 32$, and $m\angle T = 36$.
 a. $\Delta QRS \sim \Delta U'V'T$; $\frac{15}{32}$ b. $\Delta RSQ \sim \Delta U'V'$; $\frac{1}{2}$ c. $\Delta SRQ \sim \Delta U'V'$; $\frac{1}{2}$ d. The triangles are not similar.

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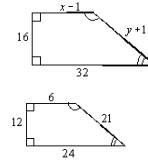


Not drawn to scale.

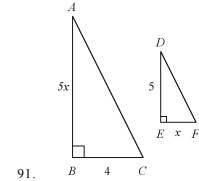
88. a. $ABCD \sim KLMN$; $9 : 1.8$ b. $ABCD \sim KLMN$; $21.6 : 1.8$ c. $ABCD \sim NKLM$; $9 : 4.68$ d. The polygons are not similar.

The polygons are similar, but not necessarily drawn to scale. Find the value of x.

89.

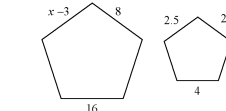


a. $x = 8$ b. $x = \frac{11}{2}$ c. $x = 9$ d. $x = 10$

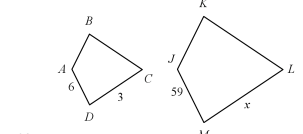


91. a. 1 b. 2 c. 4 d. 20

90.



a. $x = 13$ b. $x = 7$ c. $x = 5.5$ d. $x = 10$



92. a. 118 b. 29.5 c. 21.7 d. 177

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93. You want to draw an enlargement of a design that is printed on a card that is 4 in. by 5 in. You will be drawing this design on a piece of paper that is $8\frac{1}{2}$ in. by 11 in. What are the dimensions of the largest complete enlargement you can make?

a. $1\frac{2}{5}$ in. by $10\frac{2}{8}$ in. b. $1\frac{3}{5}$ in. by $4\frac{3}{8}$ in.
 c. $8\frac{1}{2}$ in. by $4\frac{3}{8}$ in. d. $8\frac{1}{2}$ in. by $10\frac{2}{8}$ in.

94. You are reducing a map of dimensions 2 ft by 3 ft to fit to a piece of paper 8 in. by 10 in. What are the dimensions of the largest possible map that can fit on the page?

a. $6\frac{2}{3}$ in. by 10 in. b. $5\frac{1}{3}$ in. by 10 in.
 c. 8 in. by $6\frac{2}{3}$ in. d. 8 in. by 10 in.

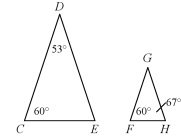
95. In a diagram of a landscape plan, the scale is 1 cm = 10 ft. In the diagram, the trees are 4.2 centimeters apart. How far apart should the actual trees be planted?

a. 42 feet b. 420 feet c. 42 centimeters
 d. 4.2 feet

96. In a scale drawing of the solar system, the scale is 1 mm = 500 km. For a planet with a diameter of 5000 kilometers, what should be the diameter of the drawing of the planet?

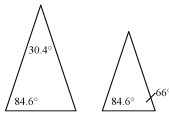
a. 10 millimeters b. 2500000 millimeters
 c. 100 millimeters d. 5000 millimeters

97. Are the two triangles similar? How do you know?



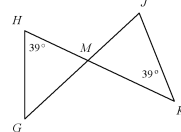
a. yes, by SAS- AA- d. no b. yes, by SSS- c. yes, by

98. Are the triangles similar? How do you know?



a. yes, by SAS- AA- d. no b. yes, by SSS- c. yes, by

99. Are the two triangles similar? How do you know?



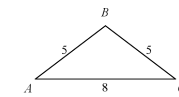
a. yes, by SAS- AA- d. no b. yes, by SSS- c. yes, by

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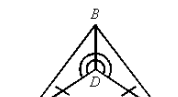
State whether the triangles are similar. If so, write a similarity statement and the postulate or theorem you used.

100.



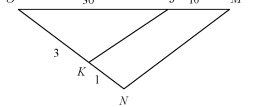
a. $\Delta ABC \sim \Delta MNO$; SSS- b. $\Delta ABC \sim \Delta MNO$; SAS- c. $\Delta ABC \sim \Delta MNO$; AA- d. The triangles are not similar.

101.



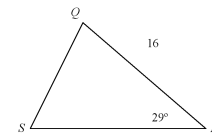
a. $\Delta ADB \sim \Delta CDB$; SAS- b. $\Delta ABD \sim \Delta CDB$; SAS- c. $\Delta ADB \sim \Delta CDB$; SSS- d. The triangles are not similar.

102.

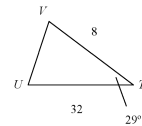


a. $\Delta OMN \sim \Delta OJK$; SSS- b. $\Delta OMN \sim \Delta OJK$; SAS- c. $\Delta OMN \sim \Delta JKO$; SAS- d. The triangles are not similar.

103.

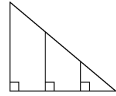
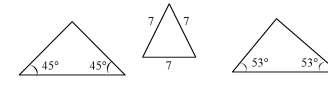


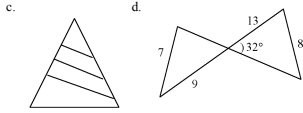
a. $\Delta SRQ \sim \Delta UTV$; ASA- b. $\Delta QRS \sim \Delta UTV$; SAS- c. $\Delta SRQ \sim \Delta UTV$; ASA- d. The triangles are not similar.



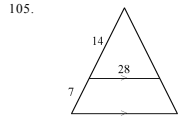
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104. Which group contains triangles that are all similar?
 a.  b. 

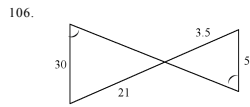


Which theorem or postulate proves the two triangles are similar?



Not drawn to scale.

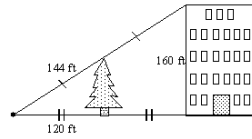
- a. SSS Theorem b. AA Postulate c. AS Postulate d. SAS Theorem



Not drawn to scale.

- a. SAS- Theorem b. SA- Postulate c. SSS- Theorem d. AA- Postulate

107. Use the information in the diagram to determine the height of the tree to the nearest foot.



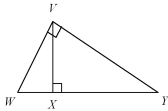
- a. 80 ft b. 264 ft c. 60 ft d. 72 ft

21

Name: _____

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112. From the similar triangles in the diagram, write a proportion using the ratio $\frac{WX}{WY}$.

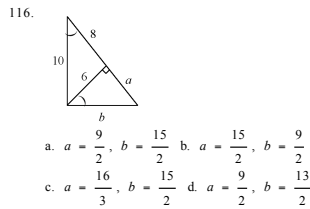


- a. $\frac{WX}{XY} = \frac{WY}{XY}$ b. $\frac{WY}{XY} = \frac{WX}{XY}$ c. $\frac{WX}{XY} = \frac{WY}{WY}$
 d. $\frac{WY}{WX} = \frac{WY}{WY}$

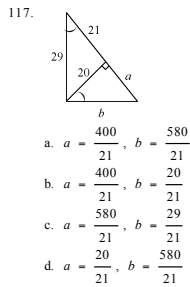
Find the geometric mean of the pair of numbers.

113. 6 and 10
 a. $\sqrt{66}$ b. $\sqrt{70}$ c. 60 d. $2\sqrt{15}$
 114. 275 and 11
 a. 65 b. 60 c. 55 d. 2904
 115. 36 and 4
 a. 22 b. 17 c. 12 d. 32

What are the values of a and b ?



- a. $a = \frac{9}{2}$, $b = \frac{15}{2}$ b. $a = \frac{15}{2}$, $b = \frac{9}{2}$
 c. $a = \frac{16}{3}$, $b = \frac{15}{2}$ d. $a = \frac{9}{2}$, $b = \frac{13}{2}$



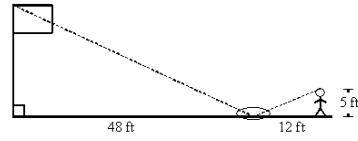
- a. $a = \frac{400}{21}$, $b = \frac{580}{21}$
 b. $a = \frac{400}{21}$, $b = \frac{20}{21}$
 c. $a = \frac{580}{21}$, $b = \frac{21}{21}$
 d. $a = \frac{20}{21}$, $b = \frac{580}{21}$

23

Name: _____

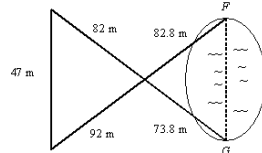
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108. Michele wanted to measure the height of her school's flagpole. She placed a mirror on the ground 48 feet from the flagpole, then walked backwards until she was able to see the top of the pole in the mirror. Her eyes were 5 feet above the ground and she was 12 feet from the mirror. Using similar triangles, find the height of the flagpole to the nearest tenth of a foot.



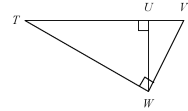
- a. 20 ft b. 38.4 ft c. 55 ft d. 25 ft

109. Campsites F and G are on opposite sides of a lake. A survey crew made the measurements shown on the diagram. What is the distance between the two campsites? The diagram is not to scale.



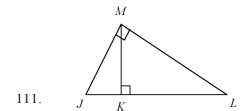
- a. 42.3 m b. 47.4 m c. 73.8 m d. 82.8 m

What similarity statement can you write relating the three triangles in the diagram?



110.

- a. $\triangle UVW \sim \triangle UWT \sim \triangle WVT$
 b. $\triangle UVW \sim \triangle WUT \sim \triangle WVT$
 c. $\triangle WUT \sim \triangle UVW \sim \triangle WVT$
 d. $\triangle TWV \sim \triangle UVW \sim \triangle UWT$



111.

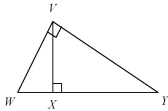
- a. $\triangle JMK \sim \triangle MLK \sim \triangle JLM$
 b. $\triangle JMK \sim \triangle LMK \sim \triangle JLM$
 c. $\triangle JLM \sim \triangle MLK \sim \triangle JKM$
 d. $\triangle JKM \sim \triangle MLK \sim \triangle JLM$

22

Name: _____

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112. From the similar triangles in the diagram, write a proportion using the ratio $\frac{WX}{WY}$.

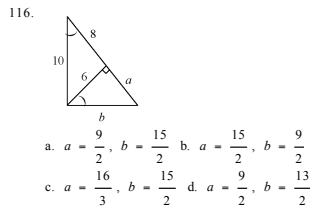


- a. $\frac{WX}{XY} = \frac{WY}{XY}$ b. $\frac{WY}{XY} = \frac{WX}{XY}$ c. $\frac{WX}{XY} = \frac{WY}{WY}$
 d. $\frac{WY}{WX} = \frac{WY}{WY}$

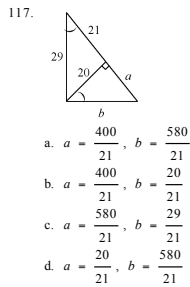
Find the geometric mean of the pair of numbers.

113. 6 and 10
 a. $\sqrt{66}$ b. $\sqrt{70}$ c. 60 d. $2\sqrt{15}$
 114. 275 and 11
 a. 65 b. 60 c. 55 d. 2904
 115. 36 and 4
 a. 22 b. 17 c. 12 d. 32

What are the values of a and b ?



- a. $a = \frac{9}{2}$, $b = \frac{15}{2}$ b. $a = \frac{15}{2}$, $b = \frac{9}{2}$
 c. $a = \frac{16}{3}$, $b = \frac{15}{2}$ d. $a = \frac{9}{2}$, $b = \frac{13}{2}$

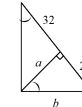


- a. $a = \frac{400}{21}$, $b = \frac{580}{21}$
 b. $a = \frac{400}{21}$, $b = \frac{20}{21}$
 c. $a = \frac{580}{21}$, $b = \frac{21}{21}$
 d. $a = \frac{20}{21}$, $b = \frac{580}{21}$

23

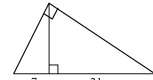
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118. 

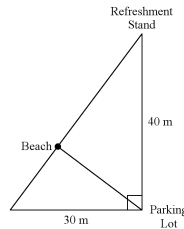
- a. $a = 8$, $b = 2\sqrt{17}$ b. $a = 18$, $b = 2\sqrt{17}$
 c. $a = 8$, $b = 8\sqrt{17}$ d. $a = 64$, $b = 68$

119. Find the length of the altitude drawn to the hypotenuse. The triangle is not drawn to scale.



- a. 28 b. $7\sqrt{3}$ c. 147 d. $2\sqrt{7}$

120. Jason wants to walk the shortest distance to get from the parking lot to the beach.



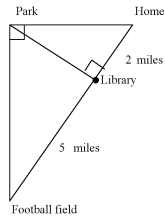
- a. How far is the spot on the beach from the parking lot?
 b. How far will his place on the beach be from the refreshment stand?
 a. 24 m; 32 m b. 38 m; 12 m c. 34 m; 16 m d. 24 m; 18 m

24

Name: _____

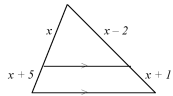
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121. Kristen lives directly east of the park. The football field is directly south of the park. The library sits on the line formed between Kristen's home and the football field at the exact point where an altitude to the right triangle formed by her home, the park, and the football field could be drawn. The library is 2 miles from her home. The football field is 5 miles from the library.



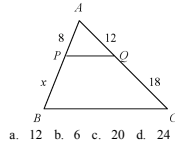
- a. How far is library from the park?
 b. How far is the park from the football field?
- a. $\sqrt{10}$ miles; $\sqrt{35}$ miles b. $\sqrt{10}$ miles; $2\sqrt{3}$ miles c. $\sqrt{7}$ miles; $2\sqrt{3}$ miles d. 4 miles; 6 miles

122. What is the value of x ?



- a. 5 b. 2.5 c. 7.5 d. 10

123. What is the value of x , given that $\overline{PQ} \parallel \overline{BC}$?

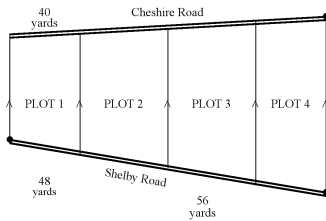


- a. 12 b. 6 c. 20 d. 24

Name: _____

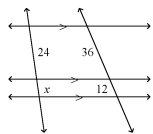
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128. Plots of land between two roads are laid out according to the boundaries shown. The boundaries between the two roads are parallel. What is the length of Plot 3 along Cheshire Road?



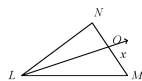
- a. $46\frac{2}{3}$ yards b. $67\frac{1}{3}$ yards c. 66 yards d. $37\frac{1}{3}$ yards

129. What is the value of x ?



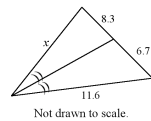
- a. 8 b. 12 c. 6 d. 2

130. \overline{LO} bisects $\angle NLM$, $LM = 18$, $NO = 4$, and $LN = 10$. What is the value of x ?



- a. 7.2 b. 45 c. 5.43 d. 2.22

131. What is the value of x to the nearest tenth?

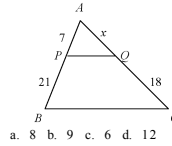


- Not drawn to scale.
 a. 4.8 b. 14.4 c. 9.4 d. 1.7

Name: _____

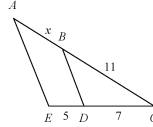
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124. What is the value of x , given that $\overline{PQ} \parallel \overline{BC}$?



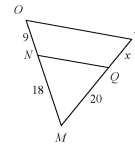
- a. 8 b. 9 c. 6 d. 12

125. What is the value of x , given that $\overline{AE} \parallel \overline{BD}$?



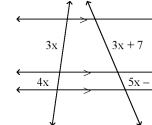
- a. $7\frac{6}{7}$ b. $3\frac{2}{11}$ c. $15\frac{2}{5}$ d. $26\frac{2}{5}$

126. What is the value of x , given that $\overline{OP} \parallel \overline{NQ}$?



- a. $x = 10$ b. $x = 20$ c. $x = 13$ d. $x = 25.5$

127. What is the value of x ?

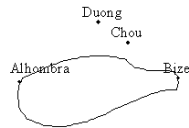


- a. $\frac{52}{3}$ b. $\frac{3}{4}$ c. 17 d. $\frac{52}{7}$

Name: _____

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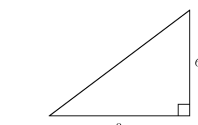
132. Four explorers are trying to find the distance across an oddly shaped lake. They position themselves as shown in the diagram. Alhombra uses her compass to instruct Chou and Duong to move along the line they form with Bizet until she sees that from her perspective the angle between Bizet and Chou is equal to the angle formed between Chou and Duong. They measure the distance between Bizet and Chou to be 35 m, between Chou and Duong to be 46 m, and between Alhombra and Duong to be 100 m. How long is the lake from east to west? Round your answer to the nearest tenth of a meter.



- a. 76.1 m b. 77.4 m c. 131.4 m d. 132.4 m

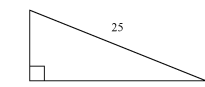
Find the length of the missing side. The triangle is not drawn to scale.

- 134.



- a. 28 b. 100 c. 10 d. 48

- 135.



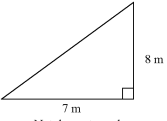
- a. 35 b. 49 c. 7 d. 2

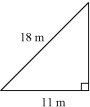
Name: _____

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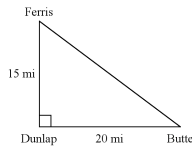
136. Triangle ABC has side lengths 9, 40, and 41. Do the side lengths form a Pythagorean triple? Explain.
- a. Yes, they form a Pythagorean triple; $9^2 + 40^2 = 41^2$ and 9, 40, and 41 are all nonzero whole numbers. b. No, they do not form a Pythagorean triple; although $9^2 + 40^2 = 41^2$, the side lengths do not meet the other requirements of a Pythagorean triple. c. No, they do not form a Pythagorean triple; $9^2 + 40^2 \neq 41^2$. d. Yes; they can form a right triangle, so they form a Pythagorean triple.

Find the length of the missing side. Leave your answer in simplest radical form.

137. 
Not drawn to scale
a. $\sqrt{17}$ m b. 113 m c. $\sqrt{113}$ m
d. $\sqrt{71}$ m

138. 
Not drawn to scale
a. $\sqrt{29}$ m b. $\sqrt{445}$ m c. $\sqrt{7}$ m
d. $\sqrt{203}$ m

139. Wayne used the diagram to compute the distance from Ferris, to Dunlap, to Butte. How much shorter is the distance directly from Ferris to Butte than the distance Wayne found?

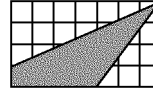


- a. 20 mi b. 25 mi c. 10 mi d. 35 mi
140. A grid shows the positions of a subway stop and your house. The subway stop is located at $(-5, 2)$ and your house is located at $(-9, 9)$. What is the distance, to the nearest unit, between your house and the subway stop?
a. 5 b. 13 c. 8 d. 18

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ID: A

141. The figure is drawn on centimeter grid paper. Find the perimeter of the shaded figure to the nearest tenth.



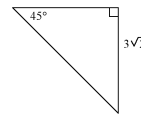
- a. 17.6 cm b. 10.8 cm c. 15.6 cm d. 18.0 cm
142. A triangle has sides of lengths 6, 8, and 10. Is it a right triangle? Explain.
a. yes; $6^2 + 8^2 \neq 10^2$ b. no; $6^2 + 8^2 = 10^2$
c. no; $6^2 + 8^2 \neq 10^2$ d. yes; $6^2 + 8^2 = 10^2$

143. A triangle has sides of lengths 24, 62, and 67. Is it a right triangle? Explain.
a. no; $24^2 + 62^2 \neq 67^2$ b. yes; $24^2 + 62^2 = 67^2$ c. yes; $24^2 + 62^2 \neq 67^2$
d. no; $24^2 + 62^2 = 67^2$

144. A triangle has side lengths of 14 cm, 48 cm, and 50 cm. Classify it as acute, obtuse, or right.
a. right b. acute c. obtuse

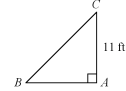
145. A triangle has side lengths of 28 in, 4 in, and 31 in. Classify it as acute, obtuse, or right.
a. obtuse b. right c. acute

146. Find the length of the hypotenuse.



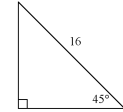
- a. 12 b. 6 c. 5 d. 18

147. In triangle ABC , $\angle A$ is a right angle and $m\angle B = 45^\circ$. Find BC . If your answer is not an integer, leave it in simplest radical form.



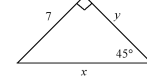
- Not drawn to scale
a. 22 ft b. $22\sqrt{2}$ ft c. 11 ft d. $11\sqrt{2}$ ft

148. Find the length of the leg. If your answer is not an integer, leave it in simplest radical form.



- Not drawn to scale
a. 128 b. $8\sqrt{2}$ c. 16 d. $2\sqrt{2}$

149. Find the lengths of the missing sides in the triangle. Write your answers as integers or as decimals rounded to the nearest tenth.

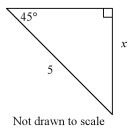


- Not drawn to scale
a. $x = 7, y = 9.9$ b. $x = 9.9, y = 7$ c. $x = 4.9, y = 6.1$ d. $x = 6.1, y = 4.9$

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150. Find the value of the variable. If your answer is not an integer, leave it in simplest radical form.

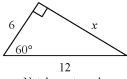


- Not drawn to scale
a. $5\sqrt{2}$ b. $\frac{5\sqrt{3}}{2}$ c. $\frac{5\sqrt{2}}{2}$ d. $5\sqrt{3}$

151. The area of a square garden is 242 m². How long is the diagonal?
a. 121 m b. $11\sqrt{6}$ m c. 484 m d. 22 m

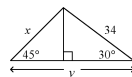
152. Quilt squares are cut on the diagonal to form triangular quilt pieces. The hypotenuse of the resulting triangles is 10 inches long. What is the side length of each piece?
a. 5 b. $5\sqrt{2}$ c. $5\sqrt{3}$ d. $10\sqrt{2}$

Find the value of the variable(s). If your answer is not an integer, leave it in simplest radical form.

156. 
Not drawn to scale
a. 2 b. $12\sqrt{3}$ c. $\frac{1}{2}$ d. $6\sqrt{3}$

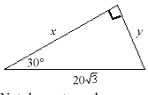
153. Find the length, d , in simplest radical form, of the diagonal of a cube with sides of s units.
a. $\sqrt{5}$ b. $s\sqrt{2}$ c. $s\sqrt{3}$ d. $3s$

154. Find the value of x and y rounded to the nearest tenth.



- a. $x = 48.1, y = 46.4$ b. $x = 48.1, y = 139.3$
c. $x = 24.0, y = 139.3$ d. $x = 24.0, y = 46.4$

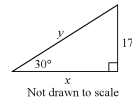
155. The length of the hypotenuse of a 30° - 60° - 90° triangle is 4. Find the perimeter.
a. $4 + 12\sqrt{3}$ b. $6 + 2\sqrt{3}$ c. $2 + 6\sqrt{3}$
d. $12 + 4\sqrt{3}$

157. 
Not drawn to scale
a. $x = 10\sqrt{3}, y = 30$ b. $x = 10, y = 30\sqrt{3}$
c. $x = 30\sqrt{3}, y = 10$ d. $x = 30, y = 10\sqrt{3}$

Name: _____

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- 158.



- Not drawn to scale
a. $x = 17, y = 34\sqrt{3}$ b. $x = 34, y = 17\sqrt{3}$
c. $x = 34\sqrt{3}, y = 17$ d. $x = 17\sqrt{3}, y = 34$

159. A piece of art is in the shape of an equilateral triangle with sides of 13 in. Find the area of the piece of art. Round your answer to the nearest tenth.
a. 146.4 in² b. 73.2 in² c. 59.8 in²
d. none of these

160. A sign is in the shape of a rhombus with a 60° angle and sides of 9 cm long. Find its area to the nearest tenth.
a. 70.1 cm² b. 3.9 cm² c. 7.8 cm² d. 35.1 cm²

161. A conveyor belt carries supplies from the first floor to the second floor, which is 24 feet higher. The belt makes a 60° angle with the ground.

How far do the supplies travel from one end of the conveyor belt to the other? Round your answer to the nearest foot.

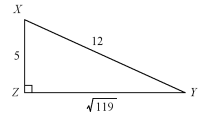
If the belt moves at 75 ft/min, how long, to the nearest tenth of a minute, does it take the supplies to move to the second floor?
a. 34 ft; 21 min b. 42 ft; 35 min c. 14 ft; 1 min d. 28 ft; 0.4 min

162. Find the missing value to the nearest hundredth.
 $\tan \square = 86$
a. 44.67° b. 89.67° c. 89.33° d. 51.67°

163. Find the missing value to the nearest hundredth.
 $\cos \square = \frac{7}{14}$
a. 39° b. 30° c. 26.57° d. 60°

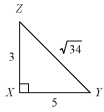
164. Find the missing value to the nearest hundredth.
 $\sin \square = \frac{2}{25}$
a. 64.71° b. 85.41° c. 4.59° d. 4.57°

165. Write the ratios for $\sin X$ and $\cos X$.



- a. $\sin X = \frac{\sqrt{119}}{5}, \cos X = \frac{5}{\sqrt{119}}$
b. $\sin X = \frac{\sqrt{119}}{\sqrt{119}}, \cos X = 5$
c. $\sin X = \frac{\sqrt{119}}{12}, \cos X = \frac{5}{12}$
d. $\sin X = \frac{5}{\sqrt{119}}, \cos X = \frac{\sqrt{119}}{5}$

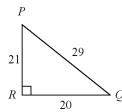
166. Write the tangent ratios for $\angle Y$ and $\angle Z$.



Not drawn to scale

- a. $\tan Y = \frac{5}{3}$; $\tan Z = \frac{3}{5}$
- b. $\tan Y = \frac{\sqrt{34}}{3}$; $\tan Z = \frac{\sqrt{34}}{5}$
- c. $\tan Y = \frac{3}{\sqrt{34}}$; $\tan Z = \frac{5}{\sqrt{34}}$
- d. $\tan Y = \frac{3}{5}$; $\tan Z = \frac{5}{3}$

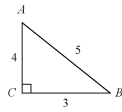
167. Write the tangent ratios for $\angle P$ and $\angle Q$.



Not drawn to scale

- a. $\tan P = \frac{29}{21}$; $\tan Q = \frac{21}{29}$
- b. $\tan P = \frac{20}{21}$; $\tan Q = \frac{21}{20}$
- c. $\tan P = \frac{21}{20}$; $\tan Q = \frac{20}{21}$
- d. $\tan P = \frac{29}{20}$; $\tan Q = \frac{20}{29}$

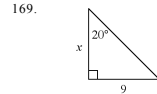
168. Write the ratios for $\sin A$ and $\cos A$.



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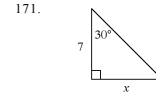
- a. $\sin A = \frac{3}{5}$, $\cos A = \frac{4}{5}$
- b. $\sin A = \frac{4}{5}$, $\cos A = \frac{3}{5}$
- c. $\sin A = \frac{3}{4}$, $\cos A = \frac{4}{5}$
- d. $\sin A = \frac{3}{5}$, $\cos A = \frac{4}{3}$

Use a trigonometric ratio to find the value of x . Round your answer to the nearest tenth.



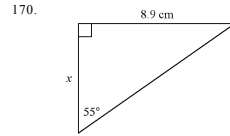
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- a. 3.3 b. 3.1 c. 24.7 d. 8.5



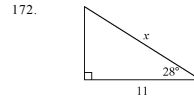
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- a. 3.5 b. 12.1 c. 6.1 d. 4



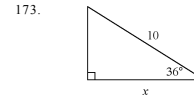
- a. 6.2 cm b. 12.7 cm c. 15.5 cm d. 10.9 cm

Find the value of x . Round to the nearest tenth.



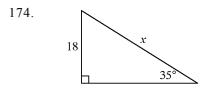
Not drawn to scale

- a. 12.5 b. 10 c. 13 d. 9.7



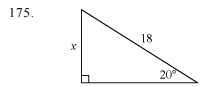
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- a. 12.9 b. 8.5 c. 12.4 d. 8.1



Not drawn to scale

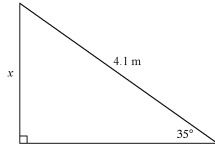
- a. 10.3 b. 31.4 c. 10.7 d. 31.8



Not drawn to scale

- a. 52.6 b. 52.9 c. 6.2 d. 6.5

176. A slide 4.1 meters long makes an angle of 35° with the ground. To the nearest tenth of a meter, how far above the ground is the top of the slide?

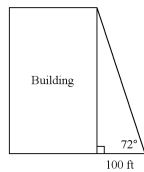


- a. 7.1 m b. 3.4 m c. 5.0 m d. 2.4 m

177. Viola drives 170 meters up a hill that makes an angle of 6° with the horizontal. To the nearest tenth of a meter, what horizontal distance has she covered?

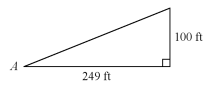
- a. 171.5 m b. 169.1 m c. 1617.4 m d. 17.8 m

178. The students in Mr. Collin's class used a surveyor's measuring device to find the angle from their location to the top of a building. They also measured their distance from the bottom of the building. The diagram shows the angle measure and the distance. To the nearest foot, find the height of the building.



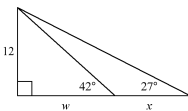
- a. 2400 ft b. 72 ft c. 308 ft d. 33 ft

179. A large totem pole in the state of Washington is 100 feet tall. At a particular time of day, the totem pole casts a 249-foot-long shadow. Find the measure of $\angle A$ to the nearest degree.



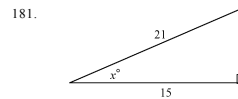
- a. 68° b. 45° c. 35° d. 22°

180. Find the value of w , then x . Round lengths of segments to the nearest tenth.



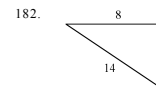
- a. $w = 13.3$, $x = 10.2$ b. $w = 10.8$, $x = 6.1$ c. $w = 13.3$, $x = 23.6$ d. $w = 10.8$, $x = 16.9$

Find the value of x . Round to the nearest degree.



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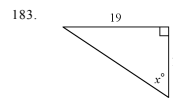
- a. 41 b. 36 c. 46 d. 44



Not drawn to scale

- a. 55 b. 35 c. 30 d. 34

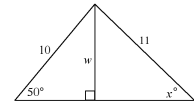
Find the value of x to the nearest degree.



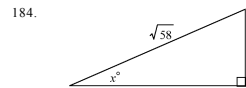
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- a. 30 b. 60 c. 70 d. 85

185. Find the value of w and then x . Round lengths to the nearest tenth and angle measures to the nearest degree.



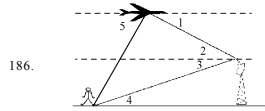
- a. $w = 7.7$, $x = 44$ b. $w = 6.4$, $x = 54$ c. $w = 7.7$, $x = 54$ d. $w = 6.4$, $x = 44$



- a. 67 b. 23 c. 83 d. 53

Name: _____

ID: A

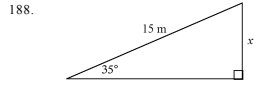


186. What is the description of $\angle 2$ as it relates to the situation shown?

- a. $\angle 2$ is the angle of elevation from the airplane to the radar tower. b. $\angle 2$ is the angle of depression from the radar tower to the airplane. c. $\angle 2$ is the angle of elevation from the radar tower to the airplane. d. $\angle 2$ is the angle of depression from the airplane to the radar tower.

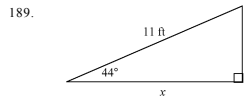
187. Find the angle of elevation of the sun from the ground to the top of a tree when a tree that is 10 yards tall casts a shadow 14 yards long. Round to the nearest degree.
a. 54° b. 36° c. 46° d. 44°

Find the value of x . Round the length to the nearest tenth.



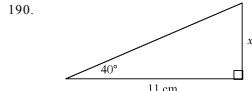
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- a. 26.2 m b. 10.5 m c. 8.6 m d. 12.3 m



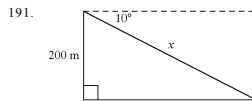
Not drawn to scale

- a. 7.6 ft b. 10.6 ft c. 15.3 ft d. 7.9 ft



Not drawn to scale

- a. 7.1 cm b. 13.1 cm c. 9.2 cm d. 8.4 cm



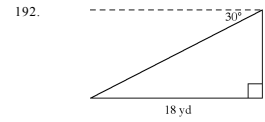
Not drawn to scale

- a. 1134.3 m b. 1151.8 m c. 34.7 m d. 203.1 m

37

Name: _____

ID: A



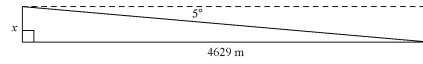
Not drawn to scale

- a. 15.6 yd b. 10.4 yd c. 9 yd d. 31.2 yd

193. To find the height of a pole, a surveyor moves 140 feet away from the base of the pole and then, with a transit 4 feet tall, measures the angle of elevation to the top of the pole to be 44° . To the nearest foot, what is the height of the pole?
a. 145 ft b. 149 ft c. 135 ft d. 139 ft

194. A spotlight is mounted on a wall 7.4 feet above a security desk in an office building. It is used to light an entrance door 9.3 feet from the desk. To the nearest degree, what is the angle of depression from the spotlight to the entrance door?
a. 39° b. 51° c. 53° d. 37°

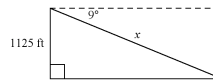
195. An airplane pilot over the Pacific sights an atoll at an angle of depression of 5° . At this time, the horizontal distance from the airplane to the atoll is 4629 meters. What is the height of the plane to the nearest meter?



Not drawn to scale

- a. 403 m b. 405 m c. 4611 m d. 4647 m

196. To approach the runway, a pilot of a small plane must begin a 9° descent starting from a height of 1125 feet above the ground. To the nearest tenth of a mile, how many miles from the runway is the airplane at the start of this approach?



Not drawn to scale

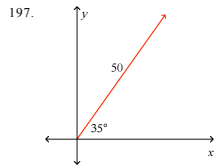
- a. 1.3 mi b. 1.4 mi c. 0.2 mi d. 7,191.5 mi

38

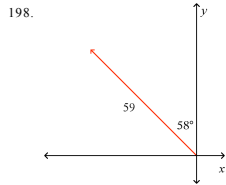
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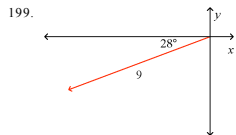
Describe the vector as an ordered pair. Round the coordinates to the nearest tenth. (Not drawn to scale.)



- a. (28.7, 41) b. (61, 87.2) c. (87.2, 61) d. (41, 28.7)



- a. (-69.6, 111.3) b. (-50, 31.3) c. (-111.3, 69.6) d. (-31.3, 50)



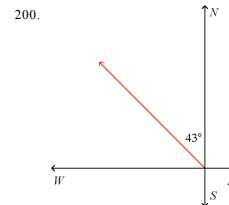
- a. (-7.9, -4.2) b. (-10.2, -19.2) c. (-4.2, -7.9) d. (-19.2, -10.2)

39

Name: _____

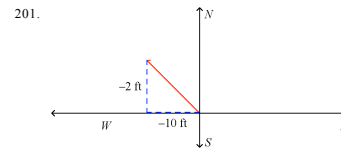
ID: A

Use compass directions to describe the direction of the vector. (Not drawn to scale.)



- a. 43° east of north b. 43° east of south c. 43° west of south d. 43° west of north

Find the magnitude and direction of the vector. Round the length to the nearest tenth and degree to the nearest unit. (Not drawn to scale.)



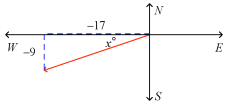
- a. about 10.2 feet; 11° north of east b. about 11 feet; 10.2° north of east c. about 10.2 feet; 11° south of west d. about 10.2 feet; 11° north of west

40

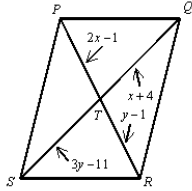
Name: _____

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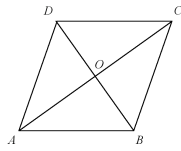
202. A glider lands 17 miles west and 9 miles south from where it took off. The result of the trip can be described by the vector $\langle -17, -9 \rangle$. Use distance (for magnitude) and direction to describe this vector a second way.



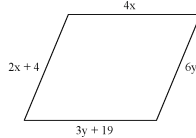
- a. about 19 miles at 28° south of west
 b. about 28 miles at 19° north of west
 c. about 19 miles at 28° north of west
 d. about 28 miles at 19° south of west
203. Find the measures of an interior angle and an exterior angle of a regular polygon with 6 sides.
204. For parallelogram $PQRS$, find the values of x and y . Then find PT , TR , ST , and TQ . The diagram is not to scale.



205. Complete this statement: For parallelogram $ABCD$, $\overline{BO} = ?$. Then state a definition or theorem that justifies your answer.



206. For what values of x and y must this quadrilateral be a parallelogram? Find the lengths of the sides. The diagram is not to scale.



207. Judging by appearance, classify the figure in as many ways as possible using *rectangle, square, quadrilateral, parallelogram, rhombus*.

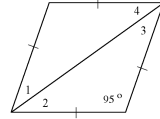


208. What type of quadrilateral has all sides congruent?

Name: _____

ID: A

209. Give the name that best describes the parallelogram and find the measures of the numbered angles. The diagram is not to scale.



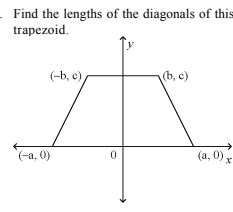
210. Isosceles trapezoid $ABCD$ has legs \overline{AB} and \overline{CD} , and base \overline{BC} . If $AB = 4y - 6$, $BC = 4y - 5$, and $CD = 5y - 19$, find the value of y .

211. For $A(-3, 2)$, $B(0, 7)$, and $C(0, 2)$, find all locations of a fourth point, D , so that a parallelogram is formed using A, B, C, D in order as vertices. Plot each point D on a coordinate grid and draw the parallelogram.

212. The fact that the diagonals of a kite are perpendicular suggests a way to place a kite in the coordinate plane. Show this placement. Include labels for the kite vertices.

218. A highway makes an angle of 6° with the horizontal. This angle is maintained for a horizontal distance of 8 miles.
 a. Draw and label a diagram to represent this situation.
 b. To the nearest hundredth of a mile, how high does the highway rise in this 8-mile section? Show the steps you use to find the distance.

213. Show how to place a rhombus in the coordinate plane so that its diagonals lie along the axes. Label the vertices using as few variables as possible.



215. In the coordinate plane, draw a square with sides $4q$ units long. Give coordinates for each vertex, and the coordinates of the point of intersection of the diagonals.

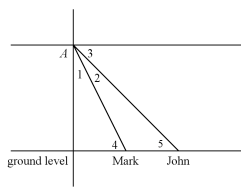
216. A right triangle has a hypotenuse length of 41, and one side length of 15. Do the side lengths form a Pythagorean triple? Explain.

217. A triangle has side lengths 10, 16, and 11. Is the triangle acute, obtuse, or right? Explain.

Name: _____

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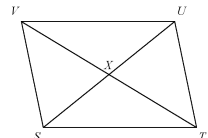
219. The diagram shows the locations of John and Mark in relationship to the top of a tall building labeled A .



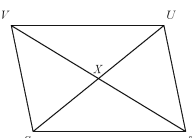
- a. Describe $\angle 4$ as it relates to the situation.
 b. Describe $\angle 3$ as it relates to the situation.
220. A forest ranger spots a fire from a 21-foot tower. The angle of depression from the tower to the fire is 12° .
 a. Draw a diagram to represent this situation.
 b. To the nearest foot, how far is the fire from the base of the tower? Show the steps you use to find the solution.

221. For a regular n -gon:
 a. What is the sum of the measures of its angles?
 b. What is the measure of each angle?
 c. What is the sum of the measures of its exterior angles, one at each vertex?
 d. What is the measure of each exterior angle?
 e. Find the sum of your answers to parts b and d. Explain why this sum makes sense.

223. **Given:** $\overline{SV} \parallel \overline{TU}$ and $\Delta SVX \cong \Delta UTX$
Prove: $VUTS$ is a parallelogram



222. Write a flow proof.
Given: $\angle STUV$
Prove: $\Delta SXT \cong \Delta UXV$

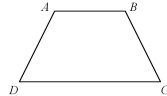


224. Explain how you can determine, without measuring any angles, whether a quadrilateral is a rectangle.

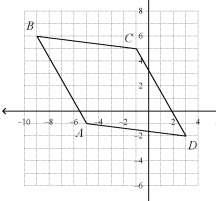
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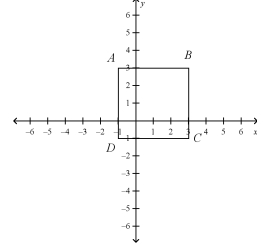
225. Write a paragraph proof to show that the base angles of an isosceles trapezoid are congruent.



226. Verify that parallelogram $ABCD$ with vertices $A(-5, -1)$, $B(-9, 6)$, $C(-1, 5)$, and $D(3, -2)$ is a rhombus by showing that it is a parallelogram with perpendicular diagonals.



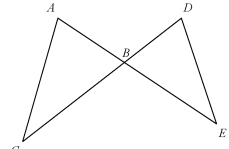
227. Find the midpoint of each side of the square. Connect the midpoints. What is the most precise classification of the quadrilateral formed by connecting the midpoints of the sides of the square?



228. Explain how the Cross Products Property is used to solve the proportion $\frac{b}{12} = \frac{b+2}{28}$.

229. Sarah is making a scale drawing of a painting that is 24 in. wide by 60 in. high. Her paper is 6 in. wide and 12 in. tall. She decides to use the scale 1 in. = 4 in. Is this a reasonable scale?

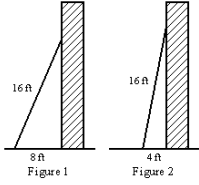
230. Write a proof.
Given: $AB \cdot BE = CB \cdot BD$
Prove: $\Delta ABC \sim \Delta DBE$



Name: _____

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231. A 16-foot ladder is placed against the side of a building as shown in Figure 1 below. The bottom of the ladder is 8 feet from the base of the building. In order to increase the reach of the ladder against the building, the ladder is moved 4 feet closer to the base of the building, as shown in Figure 2.



To the nearest foot, how much farther up the building does the ladder now reach? Show how you arrived at your answer.

232. A garden space is a triangle with angle measures of 45° , 45° , and 90° . One leg of the triangle measures 15 feet.
- Find the length of the longest side of the garden. Then sketch and label the garden space. Explain how you find the length.
 - Find the exact value of the sine and cosine of a 45° -angle.
 - Show that $(\sin 45^\circ)^2 + (\cos 45^\circ)^2 = 1$. Show your steps.
233. From the top of a 210-foot lighthouse located at sea level, the keeper spots a boat at an angle of depression of 23° .
- Draw a sketch to represent this situation.
 - Use the angle of depression to find the distance from the base of the lighthouse to the boat. Explain your steps in finding the distance.
 - Use another angle to verify the distance you found in part (b). Explain your steps in finding the distance and tell why your method works.
 - Use the Pythagorean Theorem to find the shortest distance from the top of the lighthouse to the boat. Explain your steps in finding this distance.

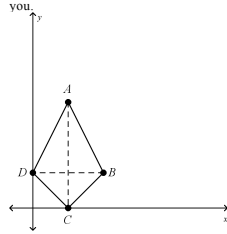
45

Name: _____

ID: A

244. \overline{AC} is a segment in the coordinate plane. Explain why sometimes it is a good idea to give points A and C the coordinates $(2a, 2b)$ and $(2c, 2d)$.
245. If you want to prove that the diagonals of a parallelogram bisect each other using coordinate geometry, how would you place the parallelogram on the coordinate plane? Give the coordinates of the vertices for the placement you choose.

246. Write the *Given* and *Prove* statements for a proof of the following theorem:
If a quadrilateral is a kite, then its diagonals are perpendicular.
Kite $ABCD$ and its diagonals have been drawn for you.



247. Golden rectangles are rectangles that are in the ratio of about 1 : 1.618. Explain how you would decide the size of an art canvas if you want it in the shape of a golden rectangle.
248. A triangle has sides that measure 33 cm, 65 cm, and 56 cm. Is it a right triangle? Explain.

249. Sketch two triangles. Label the lengths of the sides of Triangle A as 3, 4, and 5. Label the lengths of the sides of Triangle B as 5, 12, and 13.
- What is the sum of the measures of the acute angles of any right triangle? Explain your reasoning.
 - Write the tangent ratios for the acute angles of Triangle A.
 - Write the tangent ratios for the acute angles of Triangle B.
 - Write a rule describing the relationship between the tangents of the acute angles of any right triangle.
250. A private seaplane travels in a straight line from a local airstrip to a remote lake that is 207 miles west and 271 miles north of the airstrip.
- Draw and label a sketch for the vector that represents this situation.
 - Describe the vector using magnitude and direction. Explain the steps you use to find the magnitude and direction.
 - A smaller lake is located 207 miles west of the airstrip but at 23° north of west. What is the shortest distance to this lake? Explain how you find this distance.

47

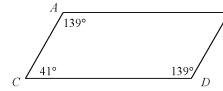
Name: _____

ID: A

234. Can this quadrilateral be a parallelogram? Explain.

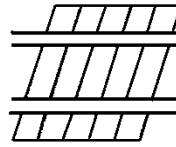


235. Is the quadrilateral a parallelogram? Explain. The diagram is not to scale.

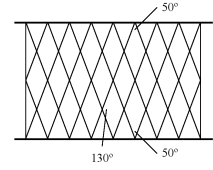


236. Give a convincing argument that quadrilateral $ABCD$ with $A(-3, -4)$, $B(0, -2)$, $C(6, -2)$, and $D(3, -4)$ is a parallelogram.

237. Yossi is building a fence for his yard. The boards are cut so that the long sides are parallel. The boards will be nailed to the horizontal rails. Explain why the quadrilaterals formed between the rails by the boards and rails are parallelograms.



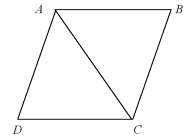
238. This gate contains a series of congruent quadrilaterals. Are the quadrilaterals also parallelograms? Explain.



239. All of the angles of a quadrilateral are congruent. Can the quadrilateral be a parallelogram? Explain.

240. Two consecutive angles of a quadrilateral are right angles, but the quadrilateral is not a rectangle. Can the quadrilateral be a parallelogram? Explain.

241. $ABCD$ is a rhombus. Explain why $\triangle ABC \cong \triangle CDA$.



242. In the coordinate plane, draw $\triangle JKL$ with $J(2, 3)$, $K(10, 4)$, and $L(6, 10)$. Classify $\triangle JKL$. Explain.

243. In the coordinate plane, draw parallelogram $ABCD$ with $A(-5, 0)$, $B(1, -7)$, $C(8, -1)$, and $D(2, 6)$. Then demonstrate that $ABCD$ is a rectangle.

46

Final Review Geometry part I Answer Section

- A
- D
- B
- D
- B
- C
- C
- C
- D
- D
- C
- D
- B
- C
- C
- C
- B
- D
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- B
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- C

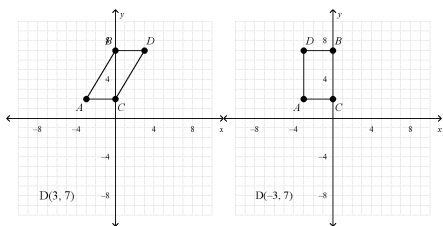
1

- 43. D
- 44. C
- 45. A
- 46. A
- 47. A
- 48. B
- 49. B
- 50. B
- 51. A
- 52. D
- 53. D
- 54. A
- 55. B
- 56. B
- 57. B
- 58. C
- 59. C
- 60. B
- 61. C
- 62. A
- 63. C
- 64. D
- 65. C
- 66. C
- 67. C
- 68. C
- 69. A
- 70. A
- 71. D
- 72. B
- 73. D
- 74. B
- 75. B
- 76. B
- 77. C
- 78. B
- 79. A
- 80. D
- 81. B
- 82. C
- 83. D
- 84. B
- 85. A
- 86. B
- 87. D
- 88. D

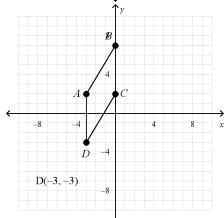
- 89. C
- 90. A
- 91. B
- 92. B
- 93. D
- 94. A
- 95. A
- 96. A
- 97. C
- 98. D
- 99. C
- 100. A
- 101. A
- 102. B
- 103. B
- 104. A
- 105. B
- 106. D
- 107. A
- 108. A
- 109. A
- 110. A
- 111. A
- 112. C
- 113. D
- 114. C
- 115. C
- 116. A
- 117. A
- 118. A
- 119. B
- 120. A
- 121. A
- 122. A
- 123. A
- 124. C
- 125. A
- 126. A
- 127. A
- 128. A
- 129. A
- 130. A
- 131. B
- 132. A
- 133. D
- 134. C

- 135. C
- 136. A
- 137. C
- 138. D
- 139. C
- 140. C
- 141. A
- 142. D
- 143. A
- 144. A
- 145. A
- 146. B
- 147. D
- 148. B
- 149. B
- 150. C
- 151. D
- 152. B
- 153. C
- 154. D
- 155. B
- 156. D
- 157. D
- 158. D
- 159. B
- 160. A
- 161. D
- 162. C
- 163. D
- 164. C
- 165. C
- 166. D
- 167. B
- 168. A
- 169. C
- 170. A
- 171. D
- 172. A
- 173. D
- 174. B
- 175. C
- 176. D
- 177. B
- 178. C
- 179. D
- 180. A

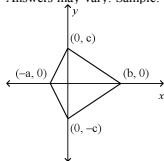
- 181. D
- 182. B
- 183. B
- 184. B
- 185. A
- 186. C
- 187. B
- 188. C
- 189. D
- 190. C
- 191. B
- 192. B
- 193. D
- 194. A
- 195. B
- 196. B
- 197. D
- 198. B
- 199. A
- 200. D
- 201. D
- 202. A
- 203. $m\angle(\text{interior}) = 120$
 $m\angle(\text{exterior}) = 60$
- 204. $x = 3, y = 6; 5, 5, 7, 7$
- 205. \overline{OD} ; the diagonals of a parallelogram bisect each other.
- 206. $x = 7, y = 3; 18, 28$
- 207. rectangle, square, rhombus, quadrilateral, parallelogram
- 208. rhombus
- 209. Rhombus; the measure of all numbered angles equals 42.5.
- 210. 13



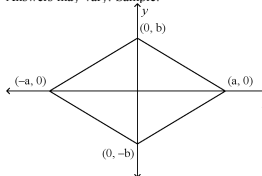
211.



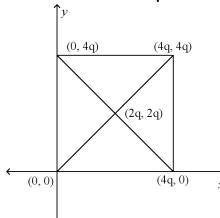
212. Answers may vary. Sample:



213. Answers may vary. Sample:



214. Each diagonal has length $\sqrt{(a+b)^2 + c^2}$.



215.

216. No, the side lengths do not form a Pythagorean triple. The missing side length is found by using the Pythagorean Theorem.

$$a^2 + b^2 = c^2$$

$$15^2 + b^2 = 41^2$$

$$225 + b^2 = 1681$$

$$b^2 = 1681 - 225$$

$$b^2 = 1456$$

$$b = 4\sqrt{91}$$

The side lengths are 15, $4\sqrt{91}$, and 41. They are NOT a Pythagorean triple because $4\sqrt{91}$ is not a nonzero whole number.

217. The triangle is obtuse. The longest side length is 16. Let $c = 16$.

$$a^2 + b^2 < c^2$$

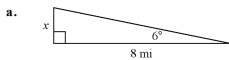
$$10^2 + 11^2 < 16^2$$

$$100 + 121 < 256$$

$$221 < 256$$

Because $a^2 + b^2 < c^2$, the triangle is obtuse.

218.



a. $\tan 6^\circ = \frac{x}{8}$ Use the tangent ratio.

$x = 8(\tan 6^\circ)$ Solve for x.

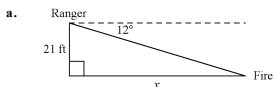
$x \approx 0.84$

The rise is about 0.84 miles.

219.

- a. $\angle 4$ is the angle of elevation from Mark to the top of the building labeled A.
- b. $\angle 3$ is the angle of depression from the top of the building labeled A to John.

220.



a. $\tan 12^\circ = \frac{21}{x}$ Use the tangent ratio.

$x = \frac{21}{\tan 12^\circ}$ Solve for x.

$x \approx 99$

The fire is about 99 feet from the base of the tower.

221.

[4] a. $\frac{180(n-2)}{180(n-2)}$

b. $\frac{n}{180(n-2)}$

c. $\frac{360}{n}$

d. $\frac{360}{n}$

e. $\frac{180(n-2)}{180(n-2)} + \frac{360}{n}$

$$= \frac{n}{180(n-2)} + \frac{360}{n}$$

$$= \frac{180n - 360 + 360}{n}$$

$$= \frac{180n}{n}$$

$$= 180$$

This sum makes sense because an interior angle and its adjacent exterior angle are supplementary.

- [3] parts a-d correct; small error in part e
- [2] parts a-d correct
- [1] three correct answers

222. [4] $STUV$ is a \square
Given
- $$\overline{VU} \cong \overline{TS} \qquad \overline{VU} \cong \overline{TS}$$
- Opposite sides are \cong . Opposite sides are \cong .
- $$VU \parallel ST$$
- Definition of a \square
- $$\angle UVT \cong \angle STV \qquad \angle VUS \cong \angle UST$$
- Alternate interior angles are \cong . Alternate interior angles are \cong .

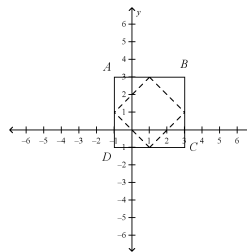
$$\triangle SXT \cong \triangle UXV$$

ASA

- [3] correct idea, some details inaccurate
[2] correct idea, not well organized
[1] correct idea, one or more significant steps omitted
223. [4] Because $\triangle SVX \cong \triangle UTX$, $\overline{SV} \cong \overline{TU}$ because corresponding parts of congruent triangles are congruent. It is given that $\overline{ST} \parallel \overline{VU}$. Therefore quadrilateral $VUTS$ is a parallelogram because if one pair of opposite sides of a quadrilateral is both congruent and parallel, then the quadrilateral is a parallelogram.
- [3] correct idea, some details inaccurate
[2] correct idea, not well organized
[1] correct idea, one or more significant steps omitted
224. [4] Shows enough properties that do not require angle measurement and concludes, based on those properties, that the quadrilateral is a rectangle. Sample: Measure to show diagonals bisect each other. This makes the quadrilateral a parallelogram. Measure to show that diagonals are congruent. This makes the parallelogram a rectangle.
- [3] demonstrates understanding of exercise, but omits one property needed to conclude quadrilateral is parallelogram
[2] gives way of determining that quadrilateral is rectangle, but includes angle measurement (such as making right angles)
[1] gives only one step necessary for concluding quadrilateral is rectangle

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225. [4] Draw $\overline{AE} \parallel \overline{BC}$ with E on \overline{DC} . Because opposite sides of $ABCE$ are parallel, $ABCE$ is a parallelogram. Thus, $\overline{BC} \cong \overline{AE}$ because they are opposite sides. The trapezoid is given to be isosceles, so legs \overline{AD} and \overline{BC} are congruent. Thus, $\overline{AD} \cong \overline{AE}$ by the Transitive Property of Congruence. $\angle D \cong \angle AED$ by the Isosceles Triangle Theorem, and $\angle AED \cong \angle C$ by the Corresponding Angles Postulate. Thus $\angle D \cong \angle C$ by the Transitive Property of Congruence. Finally, the other base angles $\angle DAB$ and $\angle B$ are congruent because supplements of congruent angles are congruent.
- [3] correct idea, some details inaccurate
[2] correct idea, not well organized
[1] correct idea, one or more significant steps omitted
226. [4] Shows $ABCD$ is a parallelogram (by any of several methods); then shows diagonals are perpendicular by computing slopes to be $\frac{3}{2}$ and $-\frac{2}{3}$. Includes meaningful commentary on what is occurring.
- [3] Shows $ABCD$ is a parallelogram and shows diagonals are perpendicular, but presentation is not clear.
[2] work complete and shows correct ideas, but contains errors
[1] work incomplete, but shows some understanding of what to do
227. [4] midpoint of $AB = (1, 3)$
midpoint of $BC = (3, 1)$
midpoint of $CD = (1, -1)$
midpoint of $DA = (-1, 1)$
The figure is a square.



- [3] Shows correct midpoints and shape, but presentation is not clear.
[2] work complete and shows correct ideas, but contains errors
[1] work incomplete, but shows some understanding of what to do

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228. The Cross Products Property says that in a proportion, the product of the extremes is equal to the product of the means. In this proportion, the product of the extremes is $28b$ and the product of the means is $12(b+2)$, or $12b+24$. By using the Cross Products Property, you can say $28b = 12b+24$.

$$\frac{b}{12} = \frac{b+2}{28}$$

$$28b = 12b + 24$$

$$16b = 24$$

$$b = \frac{24}{16} = 1 \frac{1}{2}$$

229. Answers may vary. Sample: No, the scale is not reasonable. Although the width of the paper and painting will work, on a 1 in. = 4 in. scale, the scaled drawing will be 6 inches wide, the height will not. The paper would need to be 15 inches tall to fit the entire painting at this scale.

230. [4] Answers may vary. Sample:
1. $AB \cdot BE = CB \cdot BD$ Given
2. $\frac{CB}{BE} = \frac{AB}{BD}$ Prop. of Proportions
3. $\angle ABC \cong \angle DBE$ Vertical \angle s are \cong .
4. $\triangle ABC \sim \triangle DBE$ SAS ~ Theorem
- [3] correct steps but with minor error in reasons
[2] error in steps
[1] error in steps and reasons

231. [4] Answers may vary. Sample:
The height of the ladder by the first building is
 $8^2 + h^2 = 16^2$

$$h^2 = 192$$

$$h = \sqrt{192}$$

The height of the ladder by the second building is

$$4^2 + h^2 = 16^2$$

$$h^2 = 240$$

$$h = \sqrt{240}$$

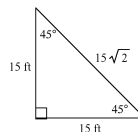
$$\sqrt{240} - \sqrt{192} = 2$$

The second ladder goes about 2 feet higher than the first ladder.

- [3] correct methods, but error in computation
[2] error in method used
[1] correct answer but work not shown

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232. [4] a.



To find the length of the longest side, recall the relationship between the length of a leg of a 45° - 45° - 90° triangle and the hypotenuse. The length of the hypotenuse, the longest side, is equal to the leg length times $\sqrt{2}$, or $15\sqrt{2}$.

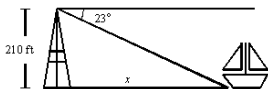
b. $\sin 45^\circ = \frac{15}{15\sqrt{2}} = \frac{\sqrt{2}}{2}$ and $\cos 45^\circ = \frac{15}{15\sqrt{2}} = \frac{\sqrt{2}}{2}$.

c. $(\sin 45^\circ)^2 + (\cos 45^\circ)^2 = \left(\frac{\sqrt{2}}{2}\right)^2 + \left(\frac{\sqrt{2}}{2}\right)^2$
 $= \frac{2}{4} + \frac{2}{4}$
 $= \frac{4}{4}$
 $= 1$

- [3] one mathematical error or correct answers with incomplete explanations
[2] two mathematical errors or correct answers with errors in explanation
[1] correct answers with no explanation

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233. [4] a.



b. $\tan 23^\circ = \frac{210}{x}$ Use the tangent ratio.
 $\tan 23^\circ(x) = 210$ Multiply each side by x .
 $\frac{\tan 23^\circ(x)}{\tan 23^\circ} = \frac{210}{\tan 23^\circ}$ Divide each side by $\tan 23^\circ$.
 $x = 494.7$ Use a calculator.

c. The distance from the base of the lighthouse to the boat is about 494.7 feet. Because the measures of the acute angles of a right triangle add to 90° , you can use the other angle in the triangle to find the distance. The measure of the other acute angle is $90^\circ - 23^\circ$, or 67° .

$\tan 67^\circ = \frac{x}{210}$ Use the tangent ratio.
 $x = 210(\tan 67^\circ)$ Multiply each side by 210.
 $x = 494.7$ Use a calculator.

d. The shortest distance from the top of the lighthouse to the boat is the hypotenuse of the right triangle with legs of length 210 feet and 494.7 feet.

$a^2 + b^2 = c^2$ Pythagorean Theorem
 $210^2 + 494.7^2 = c^2$ Substitute.
 $44,100 + 244,728 = c^2$ Simplify.
 $288,828 = c^2$ Simplify.
 $537.4 = c$ Use a calculator.

The shortest distance from the top of the lighthouse to the boat is about 537.4 feet.

- [3] one mathematical error or correct answers with incomplete explanations
- [2] two mathematical errors or correct answers with errors in explanation
- [1] correct answers with no explanation

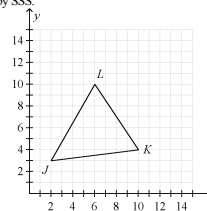
234. Yes; the quadrilateral could be a parallelogram. The opposite angles show that the opposite angles of the quadrilateral are congruent. If the unmarked angles are supplementary to the sum of one set of marked angles, then the quadrilateral is a parallelogram.
235. Yes, $\angle C$ is supplementary to both $\angle A$ and $\angle D$ because $41 + 139 = 180$. So $\overline{AB} \parallel \overline{CD}$ and $\overline{CA} \parallel \overline{DB}$ and $ABCD$ is a parallelogram.

236. Slope of \overline{AB} is $\frac{2}{3}$.
 Slope of \overline{CD} is $\frac{2}{3}$.
 Slope of \overline{BC} is 0.
 Slope of \overline{AD} is 0.

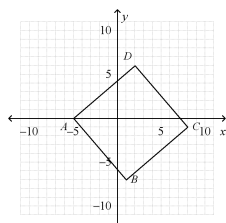
$\overline{AB} \parallel \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$.

Therefore $ABCD$ is a parallelogram.

237. The sides of the boards are given to be parallel. The rails are horizontal, so they are parallel. The quadrilaterals between the rails are parallelograms by the definition of parallelogram.
238. Yes. Because the quadrilaterals are congruent, their corresponding parts are also congruent. The diagram shows that the opposite angles each have a measure of 50 . The other given angle is supplementary to both of its consecutive angles, because $130 + 50 = 180$. If an angle of a quadrilateral is supplementary to both of its consecutive angles, then the quadrilateral is a parallelogram.
239. Yes; the sum of the angle measures of a quadrilateral is 360 . If all angles are congruent, each angle would have a measure of 90 , so the figure would be a parallelogram (a rectangle, in fact).
240. No; if it were a parallelogram, then the fact that it has two consecutive right angles would mean that it has four right angles and would have to be a rectangle.
241. $\overline{AB} = \overline{CD}$ and $\overline{BC} = \overline{DA}$ by the definition of rhombus. $\overline{AC} = \overline{AC}$ by the Reflexive Property, so $\triangle ABC = \triangle CDA$ by SSS.



242. Answers may vary. Sample:
 $\triangle JKL$ is isosceles. Two sides have the same length, the third is different.

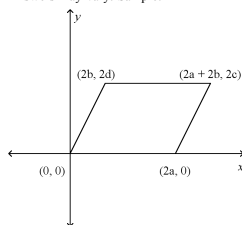


243. Answers may vary. Sample:

slope of \overline{AB} is $-\frac{7}{6}$
 slope of \overline{BC} is $\frac{6}{7}$
 slope of \overline{CD} is $-\frac{7}{6}$
 slope of \overline{AD} is $\frac{6}{7}$

$\overline{AB} \parallel \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$, so $ABCD$ is a parallelogram.
 $\overline{AB} \perp \overline{BC}$, $\overline{BC} \perp \overline{CD}$, $\overline{CD} \perp \overline{AD}$, and $\overline{AD} \perp \overline{AB}$.
 $\angle ABC$, $\angle BCD$, $\angle CDA$, $\angle BAD$ are right angles.
 $ABCD$ is a rectangle.

244. Answers may vary. Sample: Using a factor of 2 in each coordinate simplifies what you find for the coordinates of the midpoint of \overline{AB} , namely $(a + c, b + d)$.
245. Answers may vary. Sample:



246. Answers may vary. Sample:
 Given: \overline{AC} and \overline{BD} are diagonals of kite $ABCD$.
 Prove: $\overline{AC} \perp \overline{BD}$

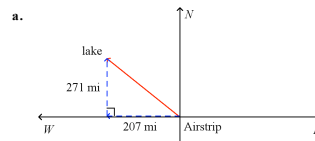
247. Answers may vary. Sample: First, fix one of the side lengths of the canvas. For example, fix the shorter side to be 18 in. Set up a proportion with one of the ratios being the ratio of the golden rectangle and the other being the ratio of the shorter side of the canvas to the longer side of the canvas.

$$\frac{1}{1.618} = \frac{\text{shorter side}}{\text{longer side}}$$

$$\frac{1}{1.618} = \frac{18}{x} \text{ so } x = 29.124 \text{ in.}$$

Your canvas could be about 18 in. by 29 in.

248. Answers may vary. Sample:
 $33^2 + 56^2 \stackrel{?}{=} 65^2$
 $1089 + 3136 \stackrel{?}{=} 4225$
 $4225 = 4225$
 It is a right triangle because the sum of the squares of the shorter two sides equals the square of the longest side.
249. a. The sum of the acute angles of any right triangle is 90° . Because the sum of the angles of a triangle is 180° , then the number of degrees left after a triangle has a right angle is $180^\circ - 90^\circ$, or 90° .
- b. $\frac{3}{4}, \frac{4}{3}$
- c. $\frac{5}{12}, \frac{12}{5}$
- d. The tangents of the acute angles of any right triangle are reciprocals.



- b. To find the magnitude or distance, use the Distance Formula.

$$\begin{aligned} d &= \sqrt{(-207 - 0)^2 + (271 - 0)^2} \\ &= \sqrt{42,849 + 116,290} \\ &= \sqrt{116,290} \\ &= 341 \end{aligned}$$

To find the direction of the flight, find the angle of the vector north of west.

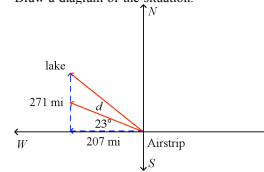
$$\tan x^\circ = \frac{271}{207}$$

$$x = \tan^{-1}\left(\frac{271}{207}\right)$$

$$x = 53^\circ$$

The plane flew about 341 miles at 53° north of west.

- c. Draw a diagram of the situation.



The shortest distance to the smaller lake is the hypotenuse of the new triangle with acute angle 23° and leg adjacent to that angle of 207 miles. To find the distance, use the cosine function.

$$\begin{aligned} \cos 23^\circ &= \frac{207}{d} \\ d(\cos 23^\circ) &= 207 \\ \frac{d(\cos 23^\circ)}{\cos 23^\circ} &= \frac{207}{\cos 23^\circ} \\ d &= 224.9 \end{aligned}$$

The shortest distance to the smaller lake is about 224.9 miles.