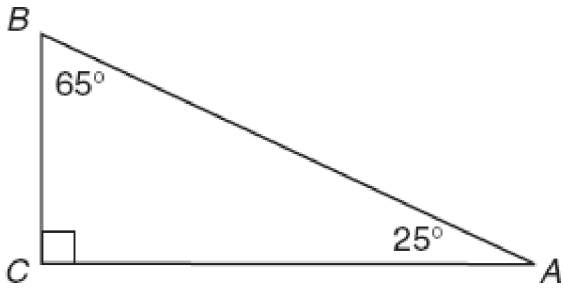1. If the sum of the measures of two angles is 90°, then the angles are complementary. In triangle ABC, $m\angle A = 25°$, $m\angle B = 65°$, $m\angle C = 90°$.


Which valid conclusion follows directly from the previous statements?

A. $\angle C$ is a complementary angle.

B. $\angle B$ and $\angle C$ are complementary angles.

C. $\angle A$ and $\angle C$ are complementary angles.

D. $\angle A$ and $\angle B$ are complementary angles.

2. Which is a true statement about angles 1 and 2 shown below?
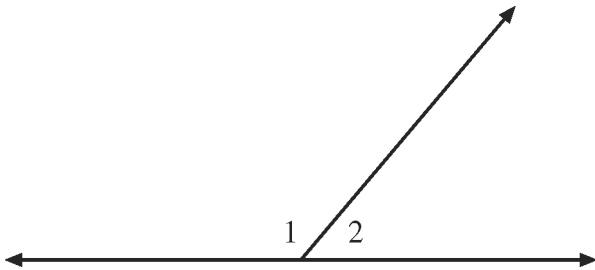
A. $\angle 1$ is complementary to $\angle 2$.   B. $\angle 1$ is supplementary to $\angle 2$.

C. Both angles are obtuse.   D. Both angles are acute.

3. The diagram below shows angles formed by intersecting lines.
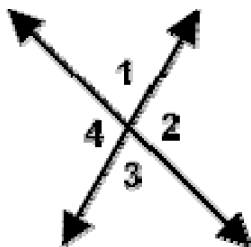
Which answer reflects the relationship between $\angle 2$ and $\angle 3$?

A. $\angle 2$ and $\angle 3$ are vertical angles.

B. $\angle 2$ and $\angle 3$ are corresponding angles.

C. $\angle 2$ and $\angle 3$ are alternate exterior angles.

D. $\angle 2$ and $\angle 3$ are adjacent supplementary angles.

4. Which term describes $\angle 1$ and $\angle 2$?
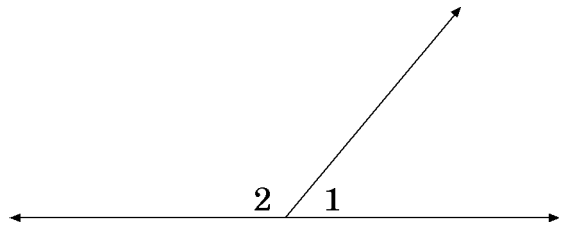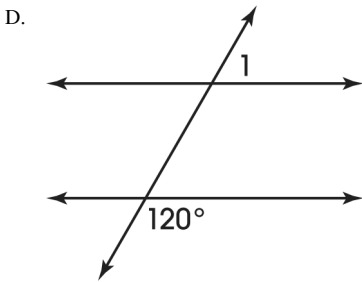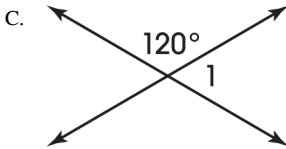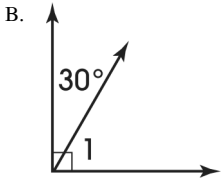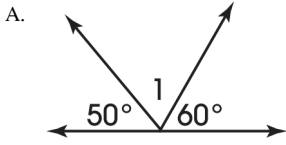

A. supplementary   B. complementary

C. vertical   D. congruent

5. Which of the following is a pair of supplementary angles?
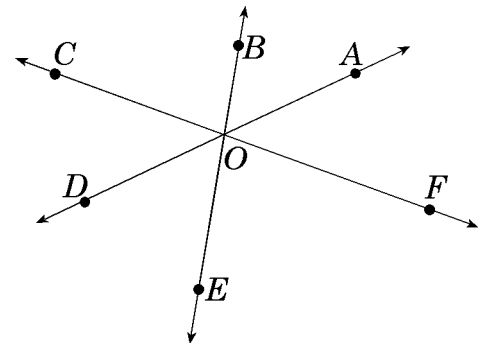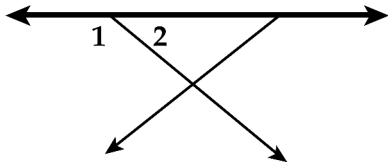

A. $\angle BOF$ and $\angle BOA$ B. $\angle COD$ and $\angle DOE$

C. $\angle COF$ and $\angle AOF$ D. $\angle DOE$ and $\angle DOB$

6. In which figure is the measure of ∠1 not equal to 60°?

A.

50° 1 60°

B.

30° 1

C.

120° 1

D.

1

120°

7. Use the figure below to answer the following question.

1 2

Which word describes the relationship between ∠1 and ∠2?

A. acute B. complementary

C. obtuse D. supplementary

8. Which angles are complementary?

2
1 3
5 4
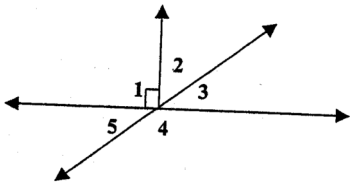
A. ∠2 and ∠3 B. ∠3 and ∠4 C. ∠4 and ∠5 D. ∠1 and ∠2

9. A diagram is shown below.
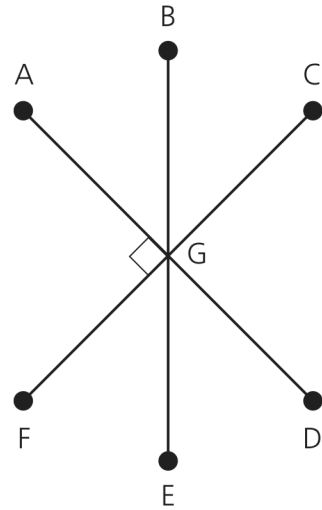
Which angle must be congruent to ∠AGB?

A. ∠DGE B. ∠EGA C. ∠AGF D. ∠CGD

10. What is the measure, in degrees, of the angle that is complementary to ∠RVS?

30°
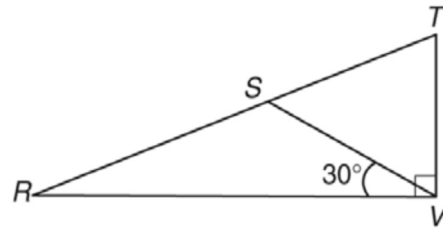
A. 30° B. 60° C. 90° D. 110°

11. What is the measure of angle 1 in the figure below?

1 120°
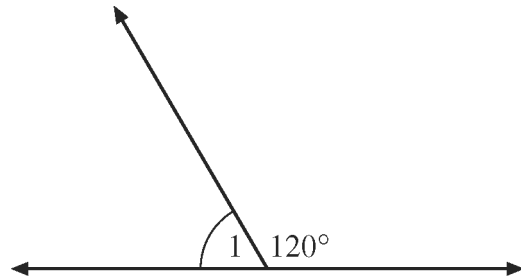
A. 30° B. 40° C. 60° D. 80°

12. In the figure below, $\overleftrightarrow{CD}$ intersects $\overleftrightarrow{AB}$ at F, $m\angle CFB = 50°$, and $\angle EFA \cong \angle AFD$. What is $m\angle EFC$?

A. 40°   B. 50°   C. 70°   D. 80°
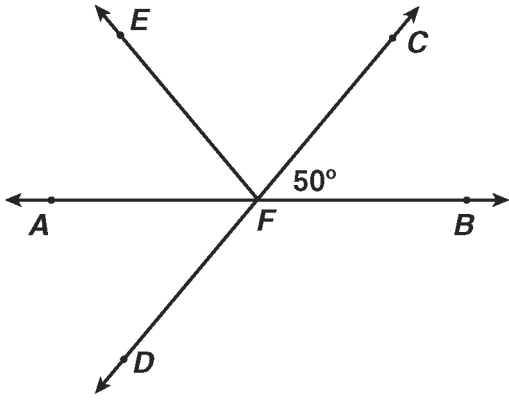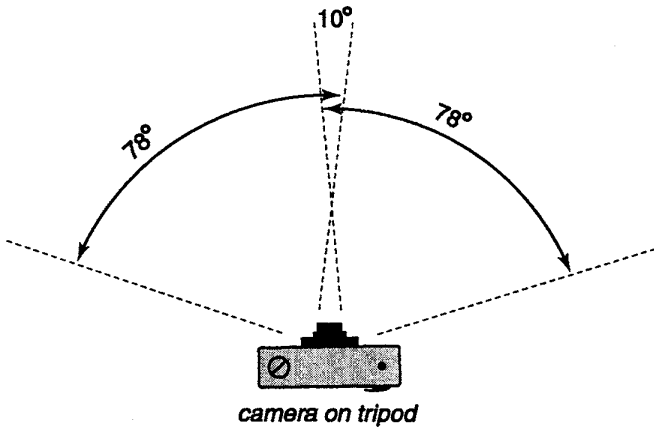
13. Julia is taking pictures with a digital camera on a tripod. She plans to make a 360° panorama using a photo software application. The lens on her camera allows her to take pictures that will measure 78°, as shown.

camera on tripod

If she takes the pictures with a 10° overlap, how many pictures will need to be taken to make a 360° panorama?

14. A straight line measures 180°. A straight line and a triangle are touching as shown in the figure below.
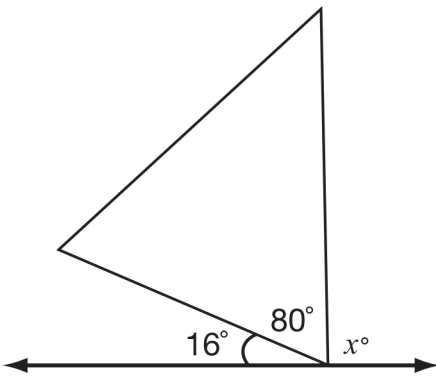
What is the value of x in the figure?

A. 64   B. 84   C. 90   D. 96

15. Angles F and G are complementary angles. Angles G and H are supplementary angles. The degree measure of each angle is a whole number. What is the smallest possible measure of angle H?

A. 1°   B. 89°   C. 91°   D. 179°

16. **Use the figure below to answer the question.**
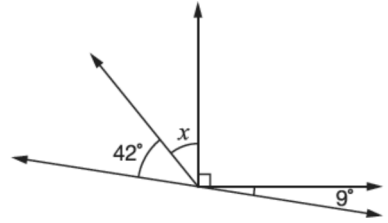
What is the value of x?

A. 39°   B. 48°   C. 51°   D. 81°

17. The figure below shows two intersecting lines.
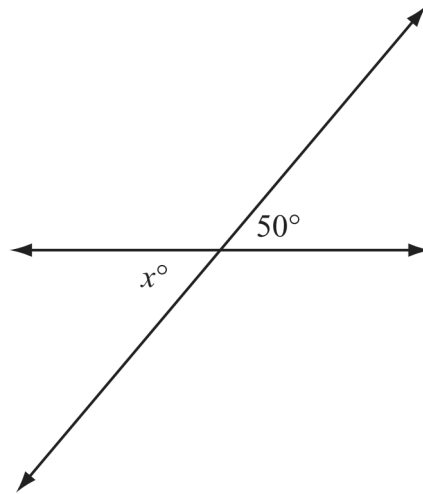
Based on the given angle measure, what is the value of x?

18. Line g intersects line h in the figure below.

Based on the angle measure given in the figure, what is the value of x?

A. 30   B. 60   C. 100   D. 120

Similarity, congruence and Proofs (unit 2)

19. Angle *XYZ* is a 180° angle. Angle *XYZ* is divided into three smaller angles, as shown below.

What is the measure of angle *XYP*?

A. 35°   B. 45°   C. 55°   D. 125°

20. Triangle *PQR*, triangle *RST*, and two angle measures are shown below.
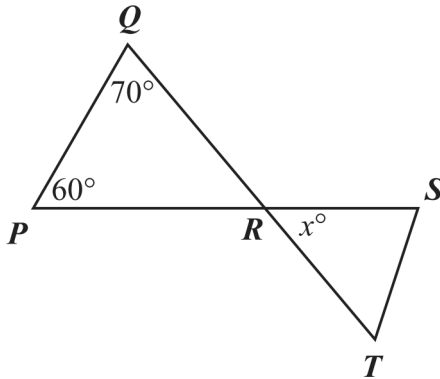
Line segment *QT* intersects line segment *PS* at point *R*.
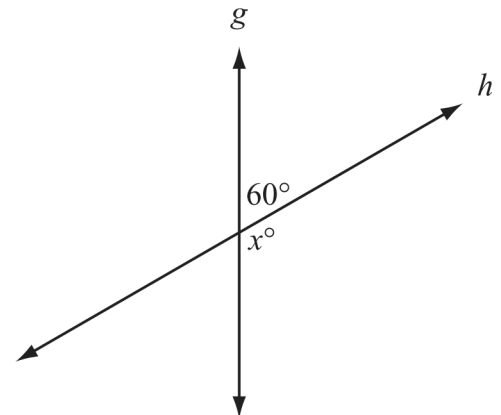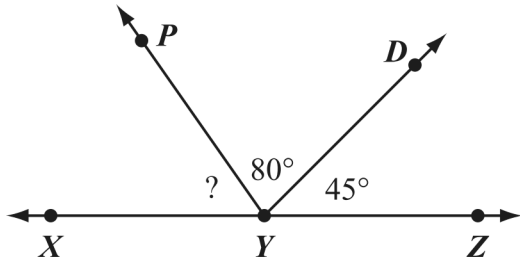
What is the value of *x*?

21. Use the figure below to answer the following question.
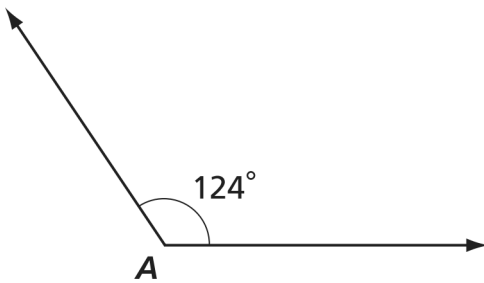
Angle *A* measures 124°. What is the measure of an angle that is supplementary to angle *A*?

A. 34°   B. 56°   C. 66°   D. 236°

22. The figure shows **supplementary** angles.
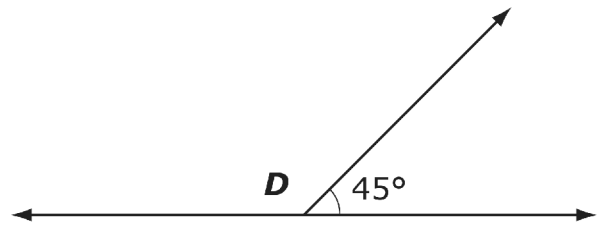
What is the measure of angle *D*?

A. 45°   B. 135°   C. 180°

23. Look at the angles formed by the intersecting lines.
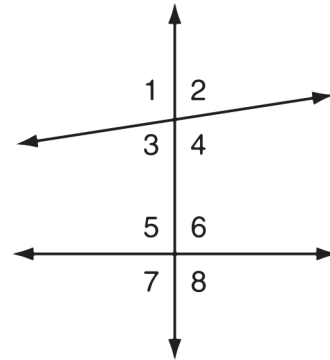
Which angles must be congruent?

A. ∠2 and ∠7   B. ∠4 and ∠6   C. ∠5 and ∠8   D. ∠3 and ∠6

24. When a marble hits a wall, it bounces off the wall at the same angle it hits the wall.

If a marble hits a wall at a 22 degree angle, what is the measure of the angle between the two paths of the marble?

A. 44°   B. 68°   C. 136°   D. 158°

Similarity, congruence and Proofs (unit 2)

25. What is the value of x in the figure below if L_1 is parallel to L_2?

$5x + 6$ L_2

$6x - 3$ L_1

A. $x = \frac{9}{11}$ B. $x = 165\frac{9}{11}$ C. $x = 9$ D. $x = -9$

26. In the figure below, $\overrightarrow{BD}$ intersects $\overleftrightarrow{AC}$ at point B.

$(3x + 10)°$ $(2x)°$

A   B   C
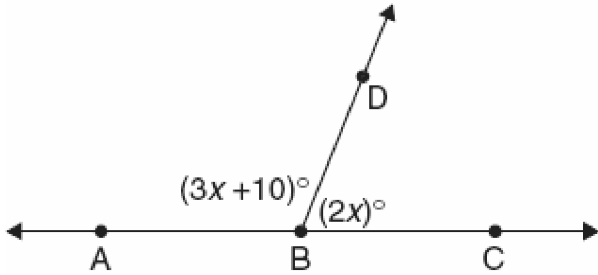
What is the measure of $\angle ABD$?

A. $68°$ B. $112°$ C. $124°$ D. $170°$

27. If the two rays are perpendicular, what is the value of m?

$25°$ $m°$ $20°$
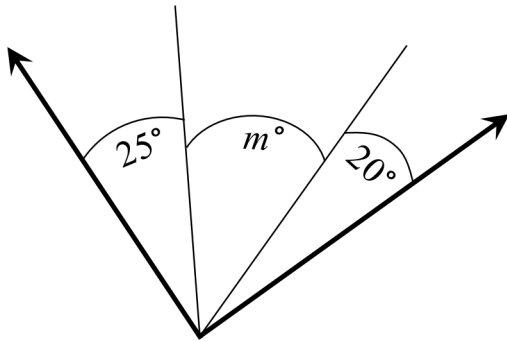
28. Line ℓ is parallel to line m. Line t is a transversal with angle measures as indicated below.

t

$(3x + 42)°$ ℓ

$(5x - 22)°$ m
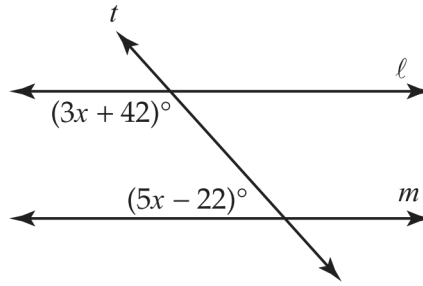
Note: The figure is not drawn to scale.

What is the value of x?

A. 16   B. 20   C. 25   D. 32

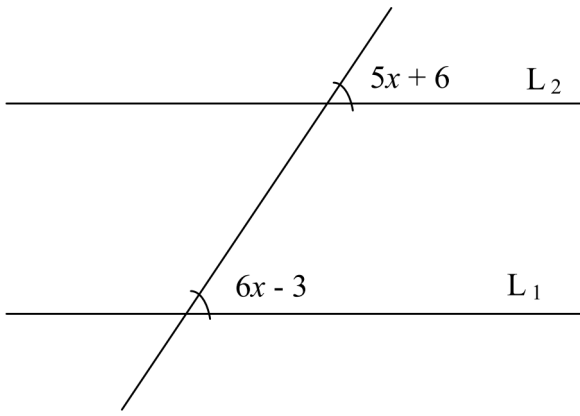29. In the diagram below, lines p and q are parallel, and line t is the transversal.

$70°$ $(x + 20)°$ t

p q
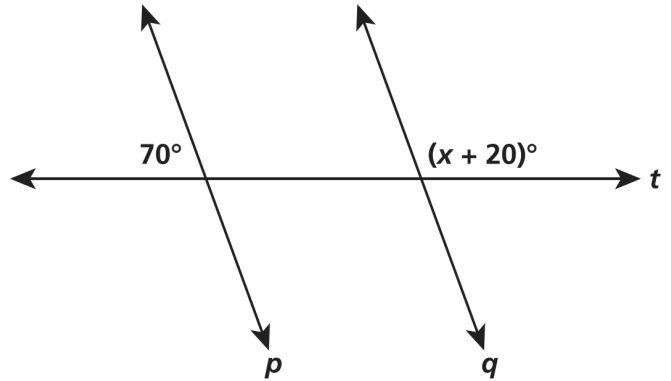
What is the value of x?

A. 50   B. 70   C. 90   D. 110

30. $\overrightarrow{OB}$ bisects $\angle AOC$. If $m\angle AOB = (3x + 16)$ and $m\angle BOC = (8x - 14)$, what is $m\angle AOB$?

A. 18   B. 26   C. 34   D. 48

Similarity, congruence and Proofs (unit 2)

31. $\overline{SU}$ intersects $\overline{TV}$ at point R. What is the value of x, in degrees?

S

T

75°

R

3x − 15

V

U

32. In the diagram below, $\angle HDA$ and $\angle ADR$ are supplementary.

A

$(7x - 3)°$ $(2x - 6)°$

H   D   R

What is the value of x?

A. 21   B. 18   C. 11   D. 9

33. In the figure shown below, lines j and k are parallel.

m

$(2x + 20)°$

j

$(x + 40)°$

k
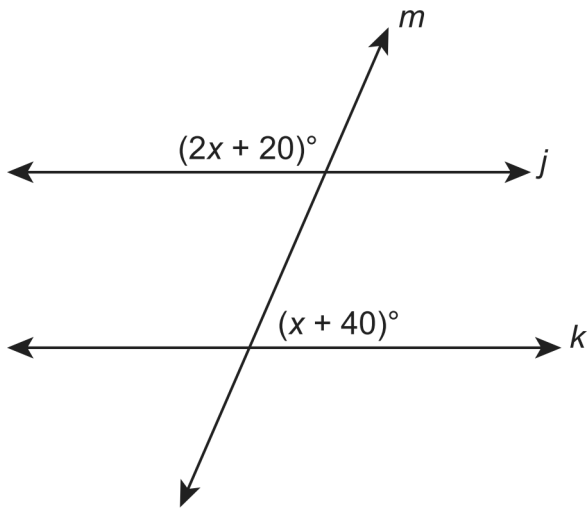
Which equation can be used to find the value of x in the figure?

A. $(x + 40) = (2x + 20)$ B. $2(x + 40) = 2x + 20$

C. $(x + 40) + (2x + 20) = 90$ D. $(x + 40) + (2x + 20) = 180$

34. In the figure below, lines A and B are straight and parallel to each other.

1 2
3 4   line A

5 6
7 8   line B
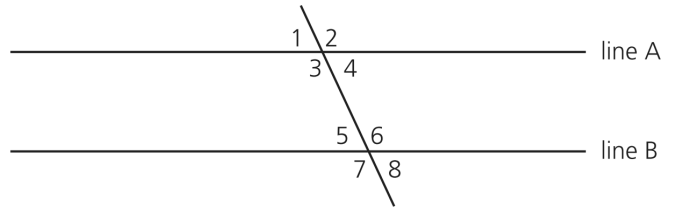
Which angles must be congruent to $\angle 1$?

A. $\angle 2$ and $\angle 6$ B. $\angle 3$ and $\angle 5$

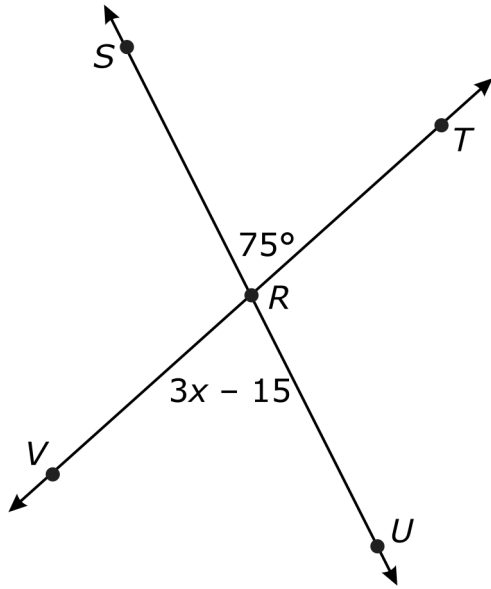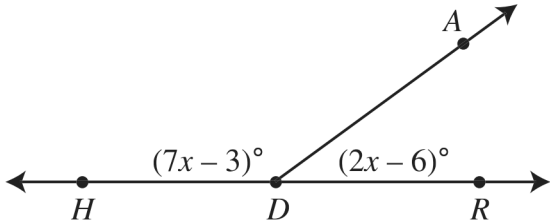C. $\angle 4, \angle 6$, and $\angle 7$ D. $\angle 4, \angle 5$, and $\angle 8$

35. If two parallel lines are cut by a nonperpendicular transversal, which type of angles are *not* congruent?
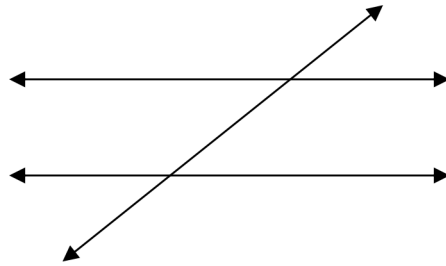
A. corresponding angles   B. alternate interior angles

C. alternate exterior angles   D. same-side interior angles

36. In the diagram below, transversal t intersects parallel lines m and n.

5 6
8 7

t

1 2
4 3

n   m
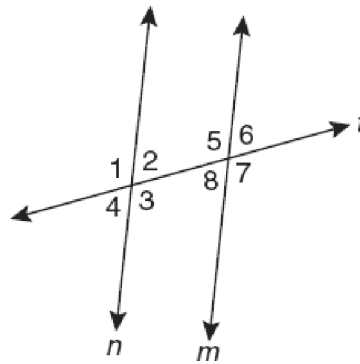
Which of the following angles is *not* congruent to $\angle A$?

A. $\angle 3$ B. $\angle 5$ C. $\angle 7$ D. $\angle 8$

Similarity, congruence and Proofs (unit 2)

37. A transversal crosses two parallel lines. Which statement should be used to prove that the measures of angles 1 and 5 sum to 180°?
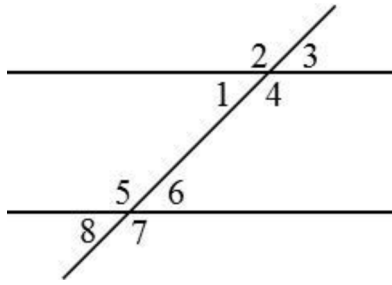
A. Angles 1 and 8 are congruent as corresponding angles; angles 5 and 8 form a linear pair.

B. Angles 1 and 2 form a linear pair; angles 3 and 4 form a linear pair.

C. Angles 5 and 7 are congruent as vertical angles; angles 6 and 8 are congruent as vertical angles.

D. Angles 1 and 3 are congruent as vertical angles; angles 7 and 8 form a linear pair.

38. In the diagram below, lines x, y, and z are all parallel, and lines r and s intersect at line y.

Which equation must be true?

A. $m\angle 1 = 180° - m\angle 7$

B. $m\angle 2 = 90° + m\angle 5$

C. $m\angle 3 + m\angle 4 = m\angle 7$

D. $m\angle 5 + m\angle 6 = m\angle 7$

39. Parallel lines r and s are cut by transversal t, as shown in the diagram below.
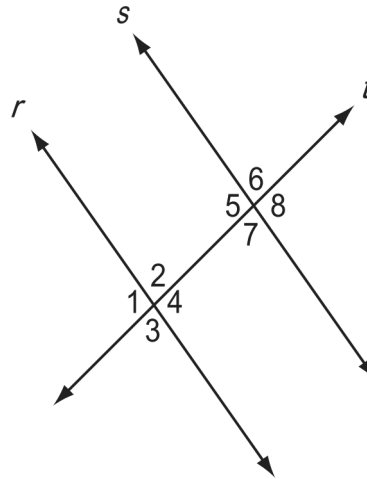
Which of the following *must* be true?

A. $m\angle 1 + m\angle 5 = 180°$

B. $m\angle 2 + m\angle 8 = 180°$

C. $m\angle 1 = m\angle 7$

D. $m\angle 3 = m\angle 8$

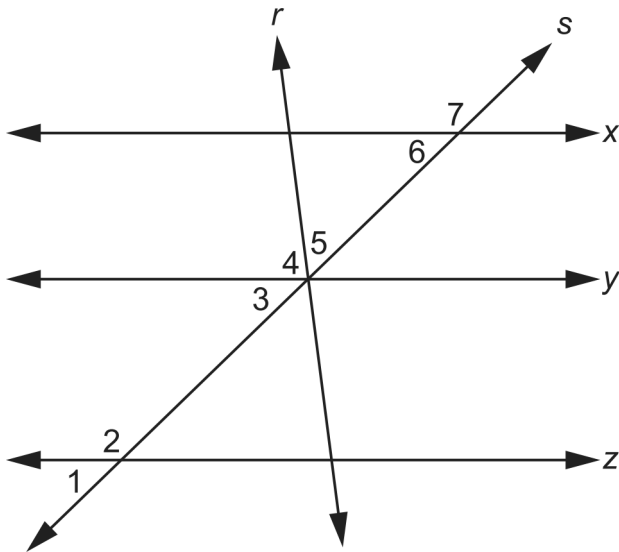40. In the diagram below, $m \parallel q$. Line w intersects lines m and q.
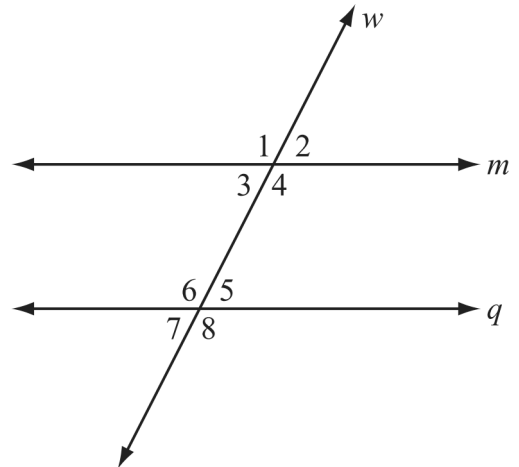
Which of the following are corresponding angles?

A. $\angle 2$ and $\angle 5$ B. $\angle 5$ and $\angle 7$ C. $\angle 7$ and $\angle 1$ D. $\angle 1$ and $\angle 2$

41. In the diagram below, $\angle 1 \cong \angle 4$.
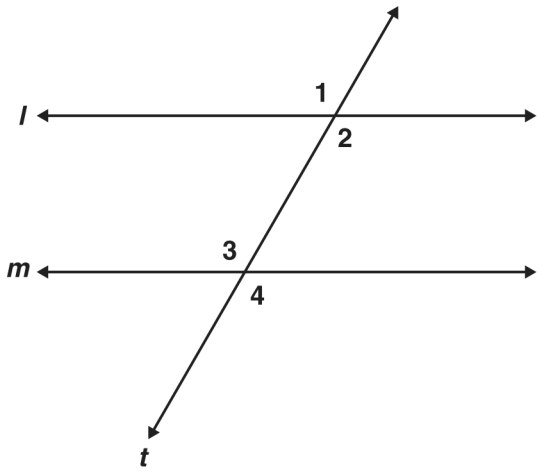
Which of the following conclusions does not have to be true?

A. $\angle 3$ and $\angle 4$ are supplementary angles.

B. Line l is parallel to line m.

C. $\angle 1 \cong \angle 3$

D. $\angle 2 \cong \angle 3$

42. Use the proof to answer the question below.

Given: $\angle 2 \cong \angle 3$

Prove: $\angle 1 \cong \angle 4$
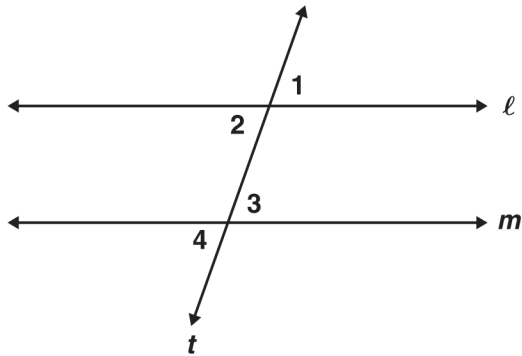
Statement	Reason
$\angle 2 \cong \angle 3$	1. Given
$\angle 1 \cong \angle 2$; $\angle 3 \cong \angle 4$	2. ?
$\angle 1 \cong \angle 4$	3. Transitive Property

What reason can be used to justify statement 2?

A. Complements of congruent angles are congruent.

B. Vertical angles are congruent.

C. Supplements of congruent angles are congruent.

D. Corresponding angles are congruent.

43. Line *AB*, line *CD*, and line *EF* are shown below.
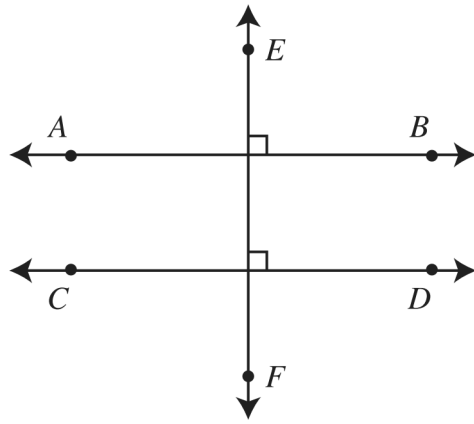
Which statement describing a relationship between line *AB* and line *CD* *must* be true?

A. The lines are parallel.

B. The lines bisect each other.

C. The lines are perpendicular.

D. The lines intersect, forming acute angles.

44. Given the diagram below, what information is needed to prove that the lines are parallel?
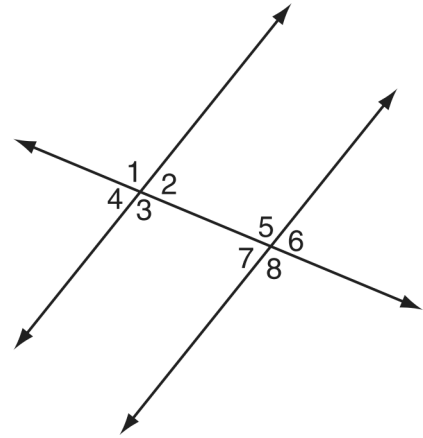
A. $m\angle 1 = m\angle 3$ B. $m\angle 1 = m\angle 6$

C. $m\angle 1 = m\angle 7$ D. $m\angle 1 = m\angle 8$

45. In the diagram below, line *l* is parallel to line *m*, and line *k* intersects both lines.
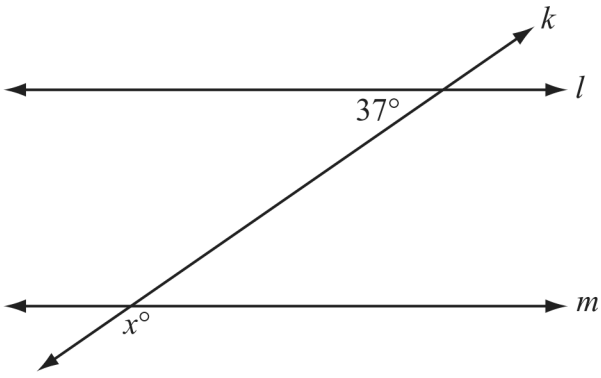
Based on the angle measure in the diagram, what is the value of *x*?

A. 37   B. 53   C. 127   D. 143

46. In the diagram below, line *l* is parallel to line *m*, and both lines are intersected by line *k*.
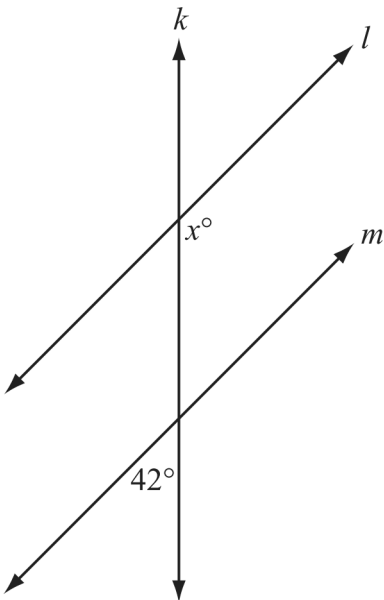
Based on the angle measure in the diagram, what is the value of *x*?

A. 42   B. 48   C. 132   D. 138

47. In the diagram below, line *t* intersects parallel lines *r* and *s*.
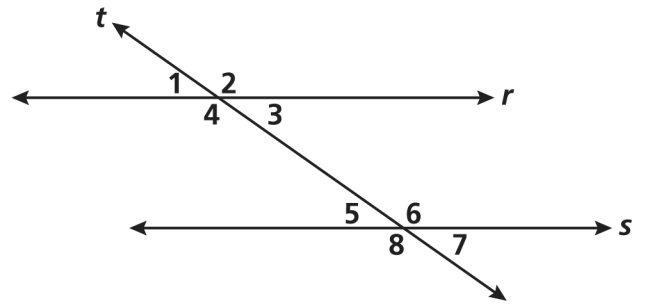
If the measure of $\angle 3 = 68°$, what is the measure of $\angle 8$?

A. 180°   B. 112°   C. 68°   D. 28°

48. Given: $p \parallel q$;
             $m \parallel n$;
             $m\angle 1 = 75°$
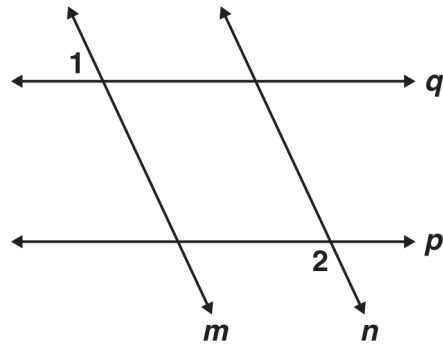
What is $m\angle 2$?

A. 15°   B. 75°   C. 90°   D. 105°

49. Lines *l* and *m* are parallel to one another and cut by transversals *s* and *t*.
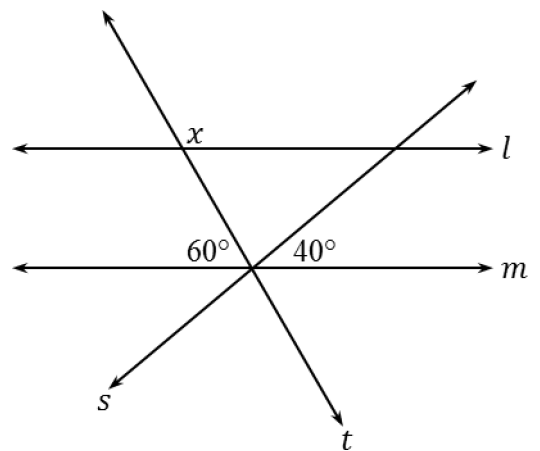
What is the value of *x*?

A. 40°   B. 80°   C. 120°   D. 140°

     Similarity, congruence and Proofs (unit 2)

50. Use the diagram below to answer the following question(s).
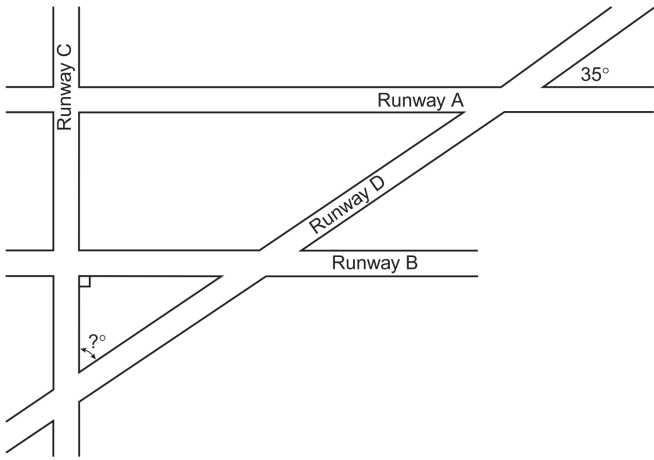
Runways A and B are parallel to each other and perpendicular to Runway C. If Runway D makes a 35° angle with Runway A as shown in the diagram, what is the measure of the angle marked in the diagram between Runways C and D?

51. The diagram below has the following properties:

- Line a is parallel to line b.
- $m + 1 + 62°$
- $m + 2 + 122°$
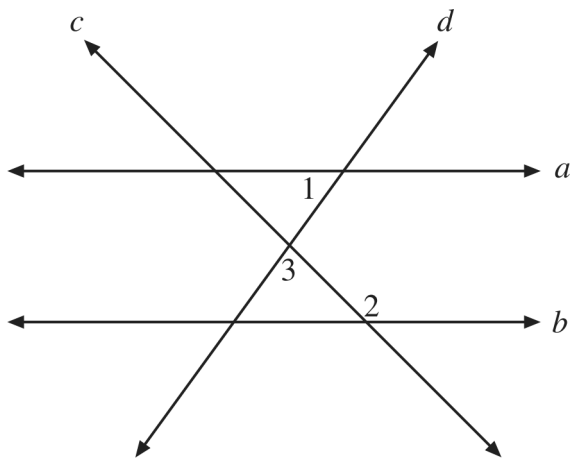
What is $m\angle 3$?

A. 56°   B. 58°   C. 60°   D. 62°

52. The lines in the diagram below represent four streets in Linda's hometown.
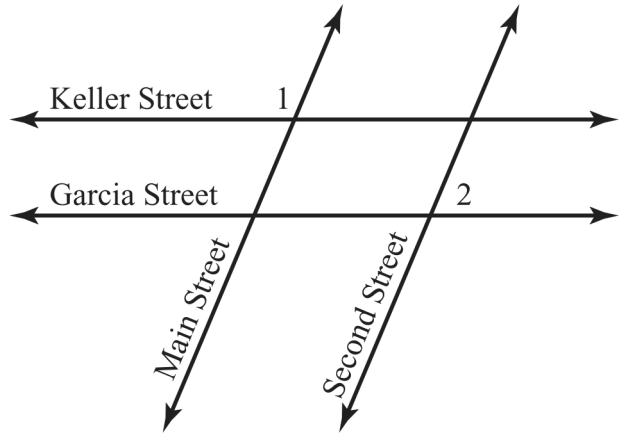
Keller Street is parallel to Garcia Street, and Main Street is parallel to Second Street.

If the $m\angle 1 = 95°$, what is the $m\angle 2$?

A. 75°   B. 85°   C. 95°   D. 105°

53. Figure QRSP is a rectangle.
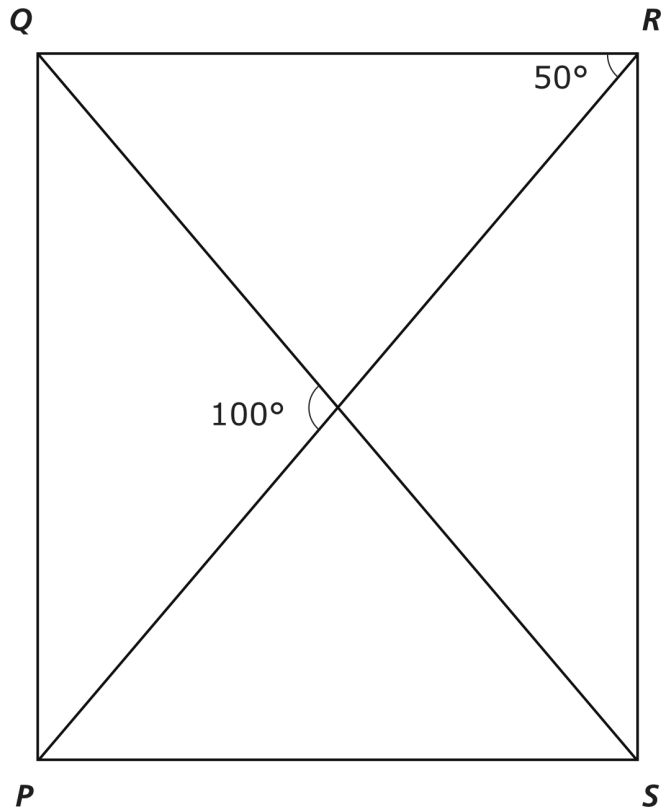
What is the measure of angle RPS?

A. 40 degrees   B. 50 degrees   C. 80 degrees

Similarity, congruence and Proofs (unit 2)

54. In the drawing below, lines r and t are perpendicular to line q, and line p intersects lines r and t.
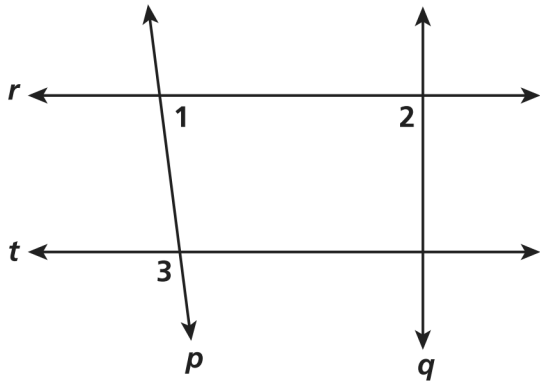
If $m\angle 1 + m\angle 2 = 160°$, what is the measure of $\angle 3$?

A. 70°   B. 80°   C. 90°   D. 110°

55. In the diagram below, lines k and m intersect parallel lines p and q.
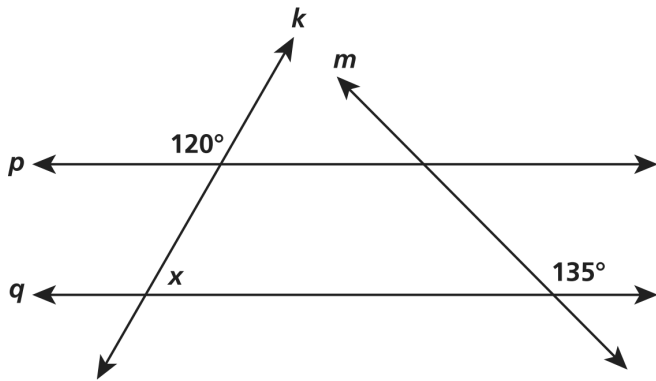
What is the value of x?

A. 45°   B. 60°   C. 120°   D. 135°

56.
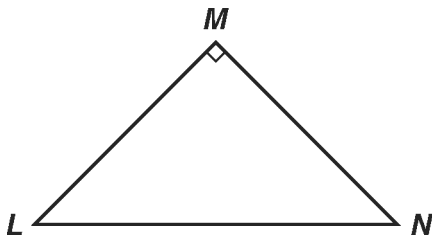
Triangle LMN is a right triangle, and angles L and N are equal. What is the measure of angle L?

A. 25°   B. 45°   C. 70°   D. 90°

57. Nina made a triangle by cutting the corner off a sheet of paper.
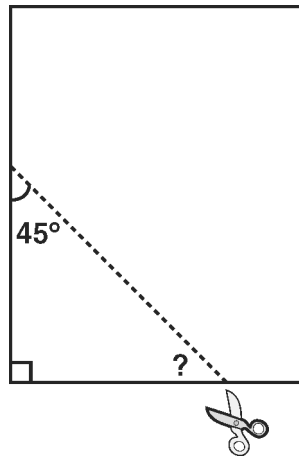
One angle is 45°. What is the measure of the third angle of Nina's triangle?

A. 30°   B. 45°   C. 55°   D. 60°

58. Andrew constructed a triangle so that $\angle 1$ and $\angle 2$ were the same size and $\angle 3$ measured 80°.
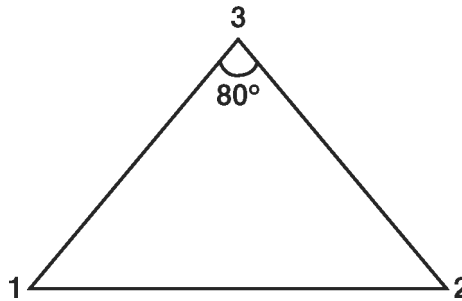
What is the measure of $\angle 1$?

A. 50°   B. 60°   C. 80°   D. 100°

59. What is the measure of angle R?
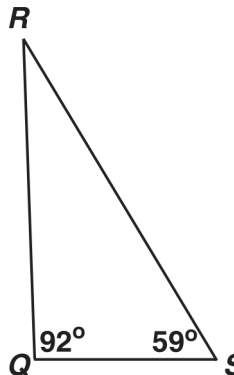
A. 17°   B. 29°   C. 31°   D. 39°

60. In this triangle, what is the measure of ∠C?
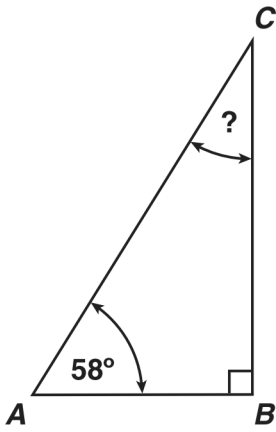
A. 32°   B. 42°   C. 58°   D. 122°

61. In the figure below, $\triangle ABC$ is a right triangle and m∠A = 40°.
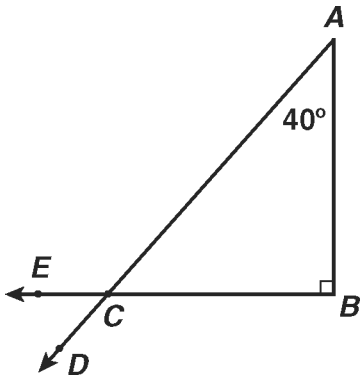
What is m∠ECD?

A. 40°   B. 50°   C. 130°   D. 140°

62. What is $m\angle x$?
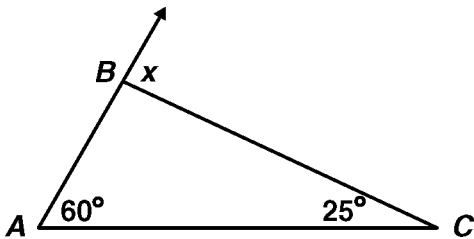
A. 35°   B. 60°   C. 85°   D. 95°

63. Write and solve an equation to find the measure of angle x.
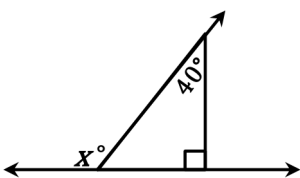
64. In the figure below, what is $m\angle DAC$?
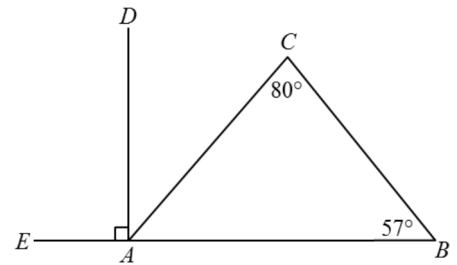
A. 47°   B. 57°   C. 90°   D. 137°

65. In the triangle, what is the degree measure of ∠ABC?
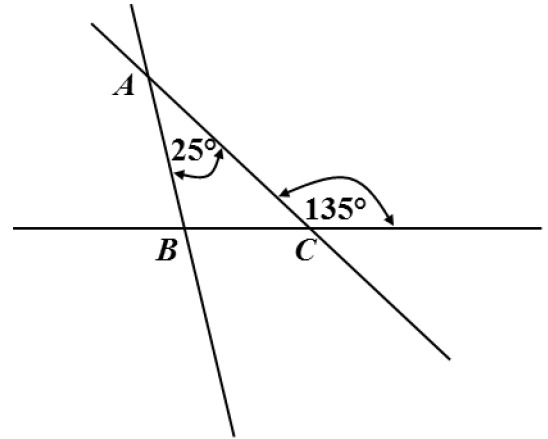
A. 45°   B. 100°   C. 110°   D. 135°

66. If $AD = BD = BC$ and the measure of ∠ADB is twice the measure of ∠BDC, what is the measure of ∠ABC?
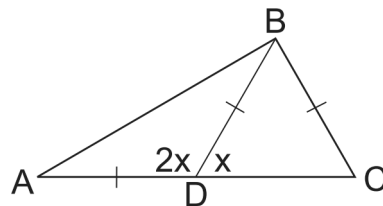
A. 70°   B. 80°   C. 90°   D. 100°

67. Each of the two interior supports for part of a roof is perpendicular to a rafter, as shown below.
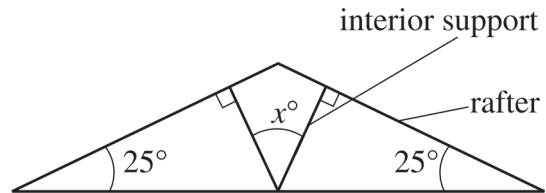
What is x, the measure, in degrees, of the angle formed by the two interior supports?

A. 50   B. 65   C. 90   D. 130

     Similarity, congruence and Proofs (unit 2)

68. A right triangle is shown below.
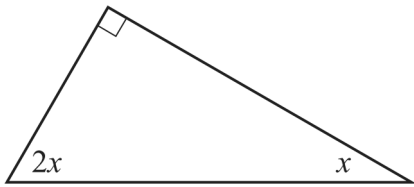
Based on the measures in the triangle, what is x?

A. $15°$ B. $30°$ C. $45°$ D. $60°$

69. In the diagram shown, what is the measure of $\angle BAC$?
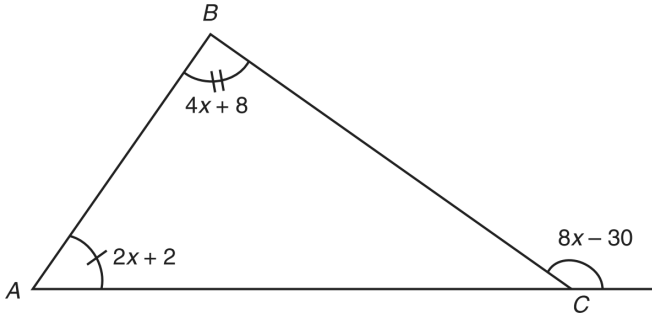
A. 30   B. 42   C. 50   D. 130

70. Use the diagram below to answer the
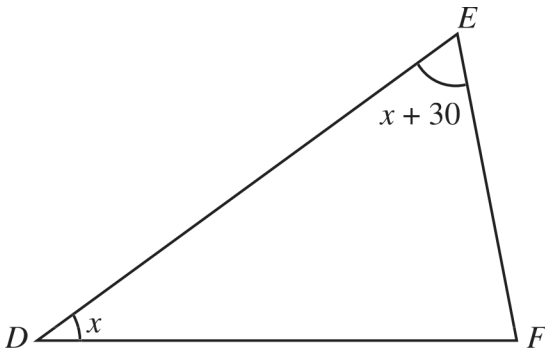
In $\triangle DEF$ above, the measure of $\angle F$ is $24°$ less than the sum of the measures of $\angle D$ and $\angle E$. Which expression represents the measure of $\angle F$?

A. $x - 24$ B. $2x - 24$ C. $2x + 6$ D. $-2x - 6$

71. Which of the following terms could not be used to describe the polygon below?
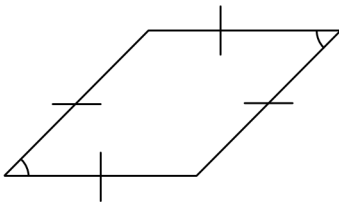
A. quadrilateral   B. square

C. parallelogram   D. rhombus

72. Which of the following is always true?

A. A rectangle is a square.

B. A rhombus is a rectangle.

C. A parallelogram is a rhombus.

D. A rectangle is a parallelogram.

73. The statements below are out of order.

1) If a figure is a square, then it is a rhombus.
2) If a figure is a parallelogram, then it is a quadrilateral.
3) If a figure is a quadrilateral, then it is a polygon.
4) If a figure is a rhombus, then it is a parallelogram.

Which of the following lists the statements in the correct logical order?

A. 2, 4, 3, 1   B. 1, 4, 2, 3   C. 3, 2, 1, 4   D. 4, 2, 3, 1

74. What do all rectangles and parallelograms have in common?

A. All rectangles and parallelograms have two sets of parallel lines.

B. All rectangles and parallelograms have sides that are equal in length.

C. All rectangles and parallelograms have right angles.

D. All rectangles and parallelograms have diagonals that are equal in length.

75. Which of the following statements is always true?

A. Every rhombus is also a square.

B. Every rectangle is also a trapezoid.

C. Every rectangle is also a parallelogram.

D. Every parallelogram is also a rhombus.

76. Delia used a rhombus to create a design. Which statement *must* be true for a quadrilateral to be a rhombus?

A. All four sides must be congruent.

B. All four angles must be congruent.

C. It must have four lines of symmetry.

D. The sum of the four interior angles must equal 180 degrees.

     Similarity, congruence and Proofs (unit 2)

77. The Venn diagram below represents the relationship between trapezoids, rectangles, squares, rhombuses, and quadrilaterals.
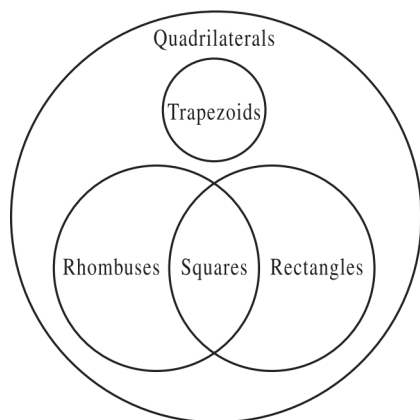
According to the diagram, which statement is *not* correct?

A. Every rhombus is a square.   B. Every square is a rectangle.

C. No trapezoid is a rhombus.   D. No rectangle is a trapezoid.

78. Which of the following is true for *all* parallelograms?

A. Diagonals are congruent.   B. Adjacent sides are congruent.

C. Opposite angles are congruent.   D. Adjacent angles are congruent.

79. Two properties of a quadrilateral are listed below.

- The quadrilateral always has 4 congruent angles.
- The quadrilateral does *not* always have 4 congruent sides.

Which of the following quadrilaterals has *both* properties?

A. square   B. rhombus   C. rectangle   D. trapezoid

80. All 4 sides of a quadrilateral are congruent and all 4 of its angles are right angles. Which statement is *not* true about this shape?

A. The shape is a parallelogram and a rectangle.

B. The shape is a rectangle and a rhombus.

C. The shape is a parallelogram and a rhombus.

D. The shape is a square and a trapezoid.

81. Look at the conditions below.

1. If a quadrilateral has four right angles, then it is a rectangle.
2. If a quadrilateral is a rectangle, then it could be a square.
3. Quadrilateral *ABCD* has four right angles.

Using these conditions, which of these is a valid conclusion?

A. Quadrilateral *ABCD* must be a square.

B. Quadrilateral *ABCD* is not a rectangle.

C. Quadrilateral *ABCD* could be a square.

D. Quadrilateral *ABCD* could be a rectangle.

82. Which shape is possible?

A. a rhombus with 4 acute angles

B. a parallelogram with 4 angles of equal measure

C. a rhombus with sides that measure 4 cm, 4 cm, 8 cm, and 8 cm

D. a parallelogram with sides that measure 2 cm, 4 cm, 6 cm, and 8 cm

83. Which two names could be given to *every* rhombus?

A. rectangle and square   B. rectangle and parallelogram

C. quadrilateral and square   D. quadrilateral and parallelogram

84. Which quadrilateral does *not* always have diagonals of equal length?

A. square   B. rhombus

C. rectangle   D. isosceles trapezoid

85. How are a rhombus and a square alike?

A. They both have four equal sides.

B. They both have four right angles.

C. They both have four equal angles.

D. They both have only one pair of parallel sides.

86. Coral was asked to draw a rhombus on the chalkboard.

Coral drew a square.

Ken told Coral that she didn't draw a rhombus.

Coral responded, "A square is a rhombus."

Which statement supports Coral's reasoning that a square is a rhombus?

A. A rhombus must have at least four sides.

B. A rhombus must have one pair of parallel sides.

C. A rhombus must have right angles.

D. A rhombus must have four congruent sides.

87. The diagonals divide each figure into two triangles.

Square   Rectangle   Rhombus   Trapezoid
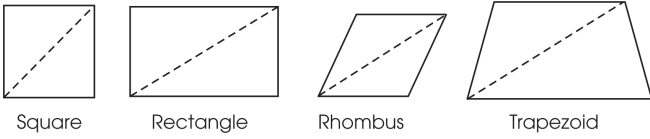
Which of the figures are always divided into congruent triangles by the diagonal?

A. only the square and rectangle

B. only the rhombus and trapezoid

C. only the square, rectangle and rhombus

D. only the rectangle, rhombus and trapezoid

88. As part of your preparation for math field day, complete the following chart indicating when the attribute is always true for the figure and then answer the questions.

Attributes

Types of Polygons	Equilateral	Equiangular	4-sided
Rectangle			
Quadrilateral			
Rhombus			
Square			

Which attribute(s) is/are not shared by both the square and the rhombus?

A. Equilateral   B. Equiangular   C. 4-sided   D. None

89. What is the value of x if $\angle L$ and $\angle N$ are the base angles of an isosceles triangle?
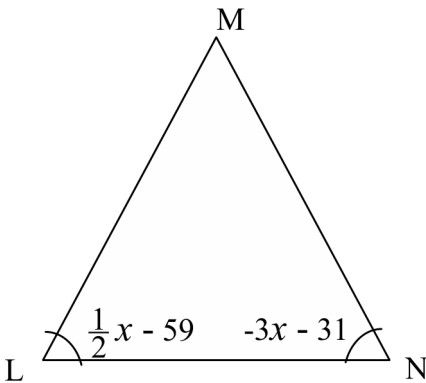
A. 8   B. 4   C. −8   D. −4

90. Which equation below represents the area (A) of the rectangle in square centimeters?

9 cm

45 cm

A. $45 = A \times 9$

B. $A = 45 \times 9$

C. $A = (2 \times 45) + (2 \times 9)$

D. $45 = (2 \times A) + (2 \times 9)$

91. What values of a and b make quadrilateral MNOP a parallelogram?
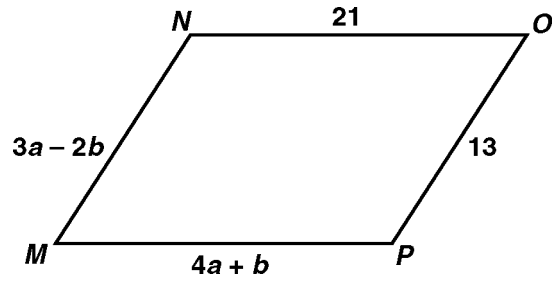
A. $a = 1, b = 5$

B. $a = 5, b = 1$

C. $a = \frac{11}{7}, b = \frac{34}{7}$

D. $a = \frac{34}{7}, b = \frac{11}{7}$

92. In the figure below, $\overline{AB} \parallel \overline{CD}$.
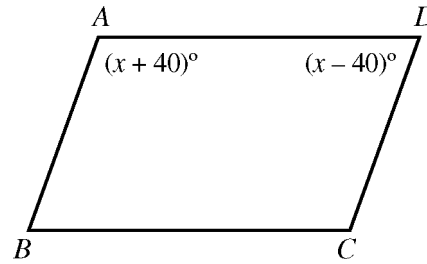
What is the value of x?

A. 40   B. 50   C. 80   D. 90

93. The students in Mr. Nolan's class are writing expressions for the perimeter of a rectangle of side length l and width w. After they share their answers, the following expressions are on the board:

- Sam: $2(l + w)$
- Joanna: $l + w + l + w$
- Kiyo: $2l + w$
- Erica: $2w + 2l$
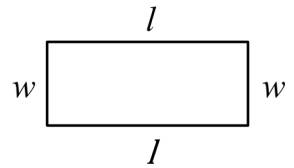
Which of the expressions are correct, and how might the students have been thinking about finding the perimeter of the rectangle?

Similarity, congruence and Proofs (unit 2)

94. Parallelogram *ABCD* is shown below.

(Not drawn to scale)
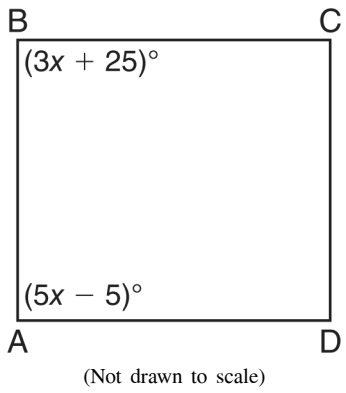
What is the measure of ∠*ABC*?

A. 85° B. 90° C. 95° D. 100°

95. Given parallelogram *EFGH*, what is the length of side $\overline{EF}$?
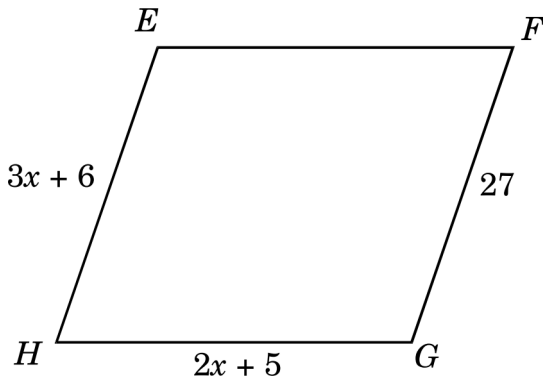
A. 27 B. 21 C. 19 D. 7

96. Marsha is using a straightedge and compass to do the construction shown below.
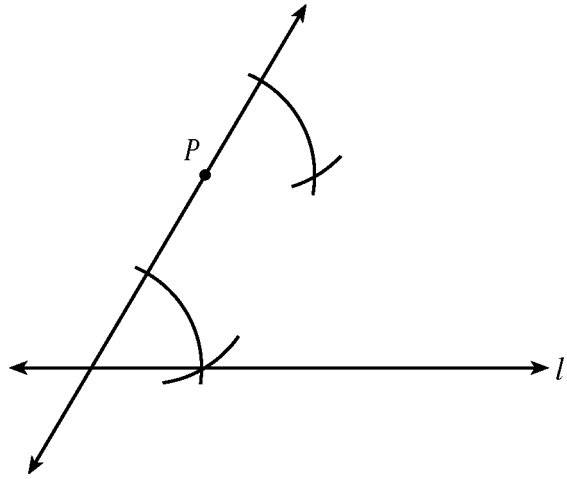
Which *best* describes the construction Marsha is doing?

A. a line through *P* parallel to line *l*

B. a line through *P* intersecting line *l*

C. a line through *P* congruent to line *l*

D. a line through *P* perpendicular to line *l*
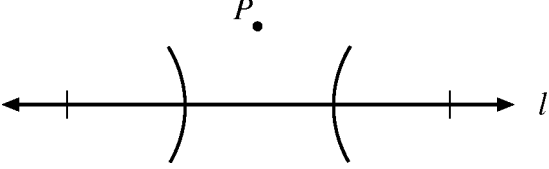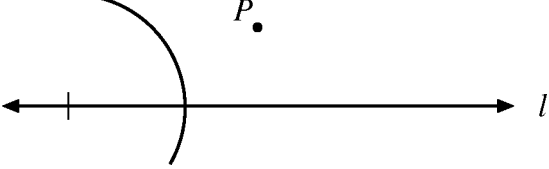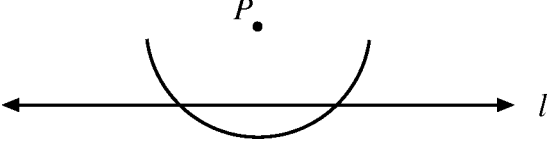
97. Given: angle *A*

What is the first step in constructing the angle bisector of angle *A*?
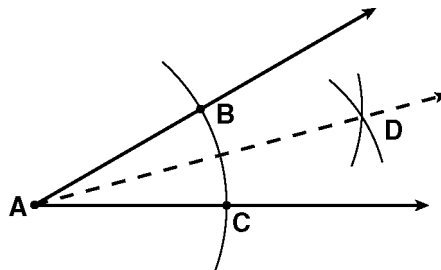
A. Draw ray $\overrightarrow{AD}$.

B. Draw a line segment connecting points *B* and *C*.

C. From points *B* and *C*, draw equal arcs that intersect at *D*.

D. From point *A*, draw an arc that intersects the sides of the angle at points *B* and *C*.

Similarity, congruence and Proofs (unit 2)

98. Scott is constructing a line perpendicular to line *l* from point *P*. Which of the following should be his first step?

A.

B.

C.

D.

99. What geometric construction is shown in the diagram below?
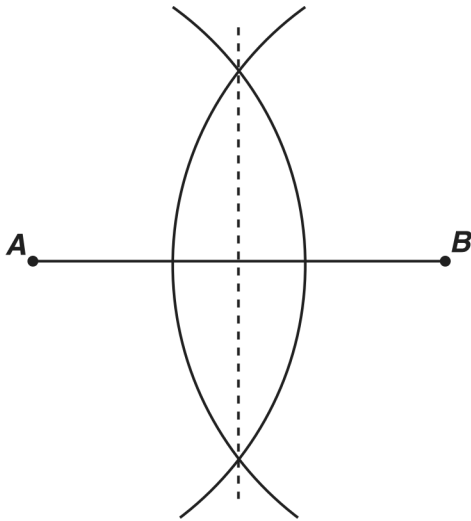
A. an angle bisector

B. a line parallel to a given line

C. an angle congruent to a given angle

D. a perpendicular bisector of a segment

100. What is the first step in constructing the angle bisector of angle *A*?
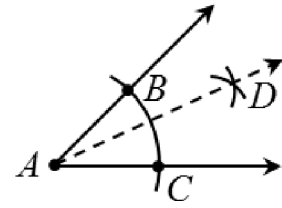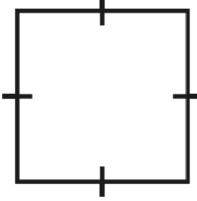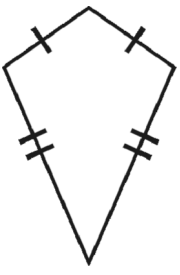
A. Draw ray $\overline{AD}$.

B. Draw a line segment connecting points *B* and *C*.

C. From points *B* and *C*, draw equal arcs that intersect at *D*.

D. From point *A*, draw an arc that intersects the sides of the angle at points *B* and *C*.
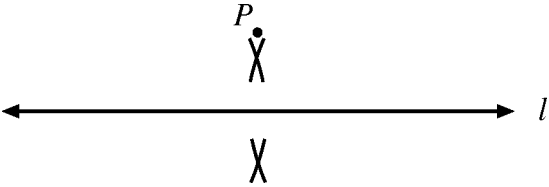
101. In $\triangle ABC$, a median is drawn from point *A* to a point $\overline{AD}$ is _____.
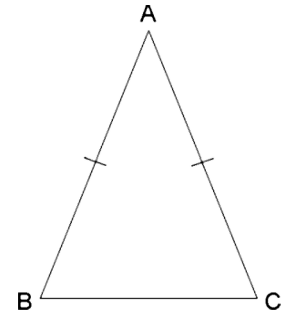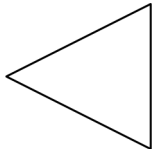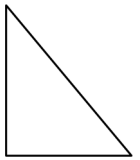
A. The bisector of $\overline{BC}$ B. The angle bisector of *A*

C. Perpendicular to $\overline{BC}$ D. All of the above

Similarity, congruence and Proofs (unit 2)

102. Jamie said that any quadrilateral that has perpendicular diagonals must be a rhombus. Which figure could be used to prove Jamie *wrong*?
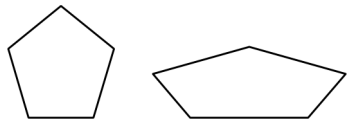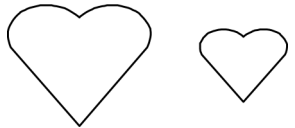
A.

B.

C.

D.

103. Which of the following shapes is similar to this triangle?
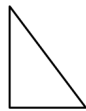
A.

B.

C.

D.
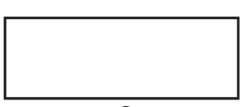
104. Which pair of figures appears to be similar?

A.

B.

C.

D.

105. Use the diagram below to answer the following question.

D　　　　　　　　E

4

G　　　12　　　F
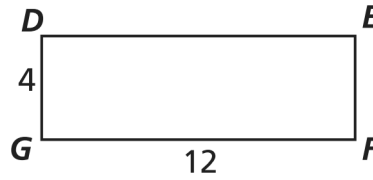
Which of the following rectangles is similar to rectangle *DEFG*?

A.

7

18

B.

6

9

C.

4

8

D.

3

9

106. Which triangle is similar to the shaded triangle?

A.

B.

C.

D.
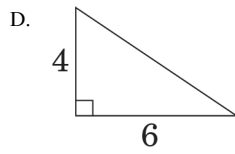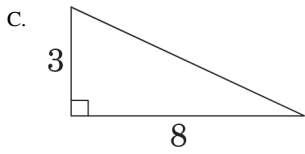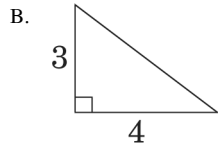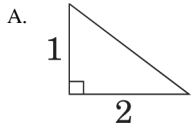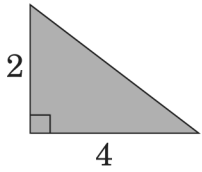
107. Which pair contains similar figures?

A.

B.

C.

D.

Similarity, congruence and Proofs (unit 2)
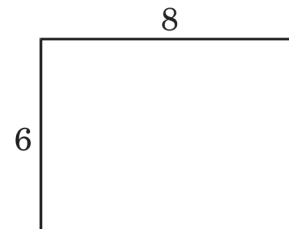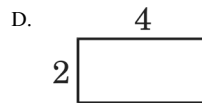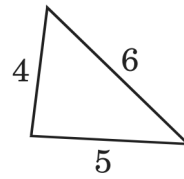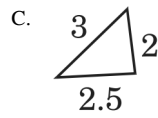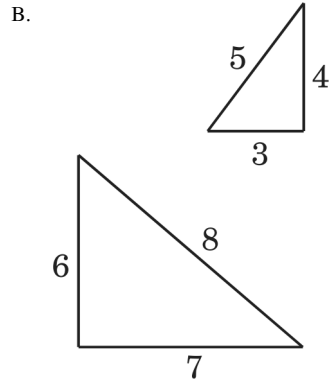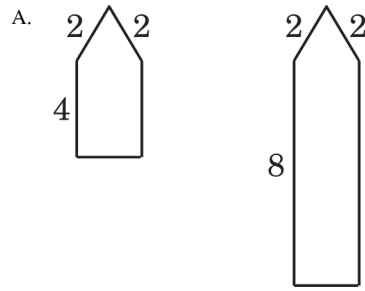
108. Triangle KLM is shown.
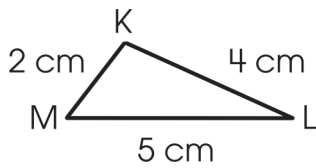
Which triangle is similar to triangle KLM?

A.

B.

C.

D.

109. A figure is shown below.
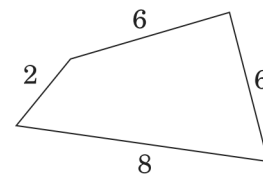
Which of the following is similar to this figure? (The figures are not drawn to scale.)

A.

B.

C.

D.

110. Donna's beach bag is similar to her sister Sally's. The figures below show some of the measurements.

Sally's Beach Bag

Donna's Beach Bag
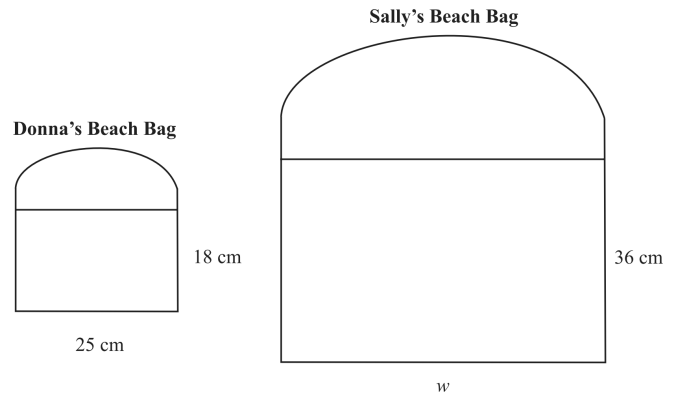
Which proportion could be used to find the width of Sally's beach bag?

A. $\dfrac{18}{36} = \dfrac{w}{25}$ B. $\dfrac{18}{25} = \dfrac{w}{36}$ C. $\dfrac{25}{36} = \dfrac{18}{w}$ D. $\dfrac{36}{w} = \dfrac{18}{25}$

Similarity, congruence and Proofs (unit 2)

111. Porch Roof

Julian is adding a porch roof to his house. The porch roof will extend 10 feet from his house and have a slant length of 12 feet. Julian plans to add support beams 8 feet from the end of the slanted length of the roof.
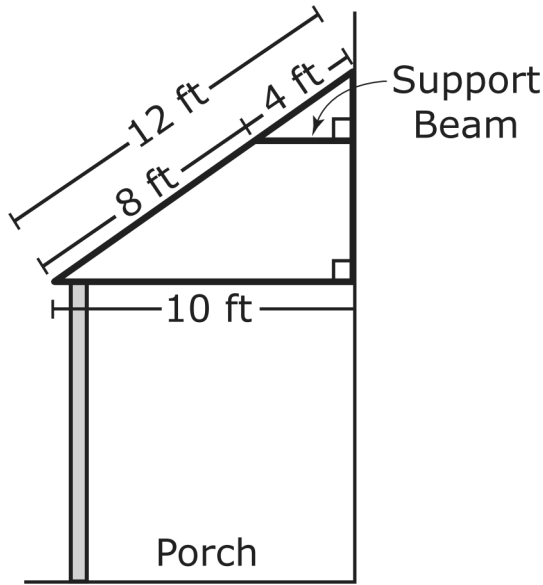
Which expression below could be used to determine the length of the support beam?

A. $\dfrac{12}{10} = \dfrac{8}{x}$ B. $\dfrac{20}{10} = \dfrac{12}{x}$ C. $\dfrac{12}{10} = \dfrac{4}{x}$ D. $\dfrac{4}{10} = \dfrac{2}{x}$

112. Kevin is standing next to the school's flagpole on a sunny day as shown in the diagram below.
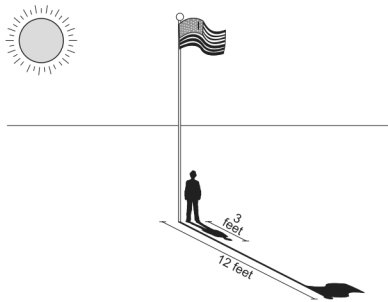
Kevin is 5 feet tall. Which proportion could you use to find the height of the flagpole?

A. $\dfrac{3}{5} = \dfrac{12}{x}$ B. $\dfrac{3}{x} = \dfrac{5}{12}$ C. $\dfrac{3}{12} = \dfrac{x}{5}$ D. $\dfrac{3}{5} = \dfrac{x}{12}$

113. In the diagram below, $\triangle LMK \sim \triangle PMN$.
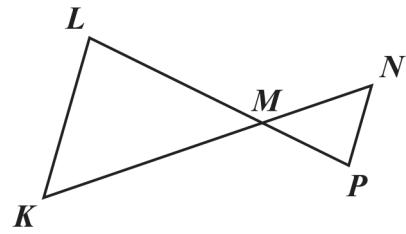
Based on the relationship between the triangles, which of the following proportions is true?

A. $\dfrac{LM}{PM} = \dfrac{KL}{NP}$ B. $\dfrac{LM}{PM} = \dfrac{NP}{KL}$ C. $\dfrac{MK}{MP} = \dfrac{KL}{NP}$ D. $\dfrac{MK}{MP} = \dfrac{NP}{KL}$

114. A ladder is placed against a fence that is 6 feet tall. The ladder extends 2 feet above the fence and 3 feet behind the fence.
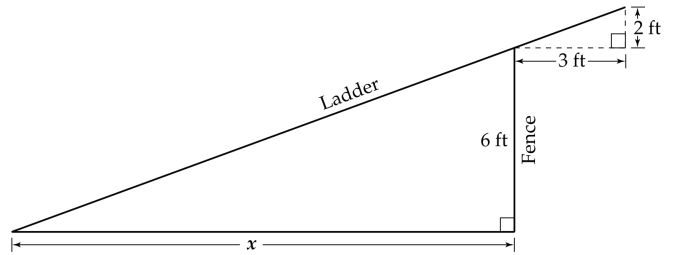
Note: The figure is not drawn to scale.

Which proportion can be used to find the distance (x) between the bottom of the ladder and the bottom of the fence?

A. $\dfrac{x}{6} = \dfrac{3}{8}$ B. $\dfrac{x}{6} = \dfrac{2}{3}$ C. $\dfrac{x}{6} = \dfrac{3}{2}$ D. $\dfrac{x}{6} = \dfrac{8}{3}$

115. If figure $ABCD \sim$ figure $JKLM$, which of the following completes this proportion?

$$\dfrac{AD}{JM} = \dfrac{BC}{?}$$

A. KL B. LM C. MJ D. JK

Similarity, congruence and Proofs (unit 2)
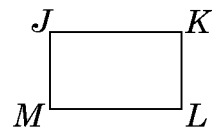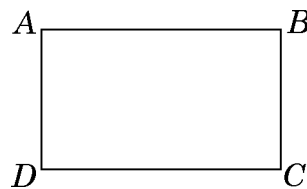
116. The triangles shown below are similar.
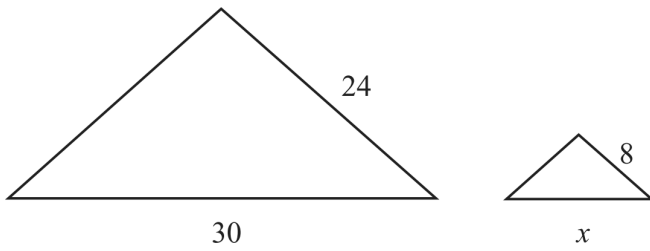
The scale factor from the large triangle to the small triangle is $3:1$. What is the length of side x of the smaller triangle?

A. 10   B. 14   C. 72   D. 90

117. Rectangle *GHIJ* ~ rectangle *KLMN*, as shown in the diagram below.
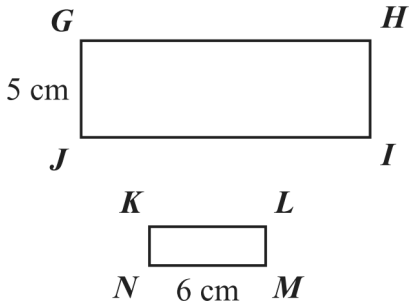
The area of rectangle *KLMN* is 12 square centimeters. Based on the dimensions in the diagram, what is the length of $\overline{JI}$?

A. 9 cm   B. 10 cm   C. 15 cm   D. 24 cm

118. In the diagram below, triangle *ABC* is similar to triangle *XYZ*.
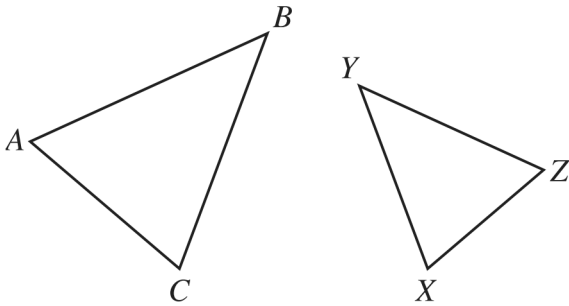
Which angle corresponds to $\angle Z$?

A. $\angle B$ B. $\angle C$ C. $\angle X$ D. $\angle Y$

119. Quadrilateral *EFGH* is similar to quadrilateral *WXYZ*, as shown below.
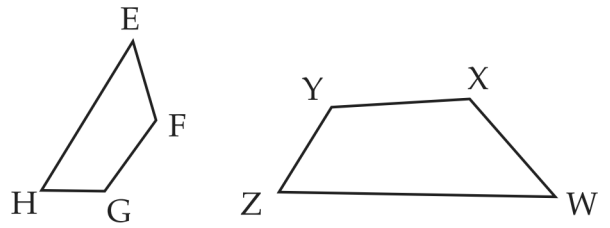
Which segment corresponds to $\overline{FG}$?

A. $\overline{WX}$ B. $\overline{WZ}$ C. $\overline{YZ}$ D. $\overline{XY}$

120. Quadrilateral *ABCD* is similar to quadrilateral *EFGH*.

Find the length of side *AB*.
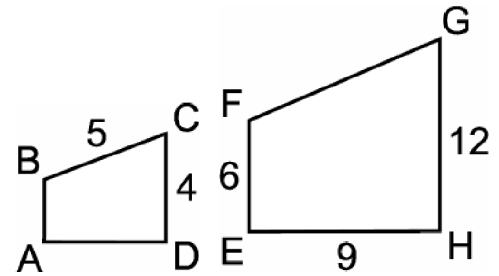
A. 1   B. 2   C. 3   D. 6

121. If figure A is similar to Figure B, what is the length of side x?

A. 0.5   B. 1   C. 1.25   D. 1.5

     Similarity, congruence and Proofs (unit 2)
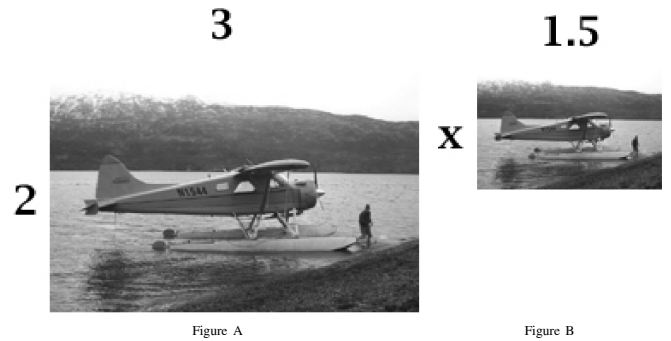
122. The diagram below shows a building, a nearby flagpole, and their shadows.

40 ft.

200 ft.

x ft.

150 ft.
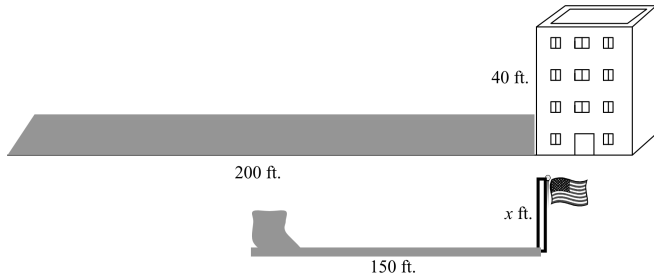
Based on the information in the diagram, what is the height of the flagpole, *x*?

A. 750 ft.   B. 50 ft.   C. 30 ft.   D. 10 ft.

123. Lloyd is standing near a telephone pole as shown in the figure below. When his head touches the support wire, he is $2\frac{1}{2}$ feet from where the wire meets the ground. If Lloyd is 5 feet tall, how tall is the telephone pole?

$8\frac{1}{2}$ feet
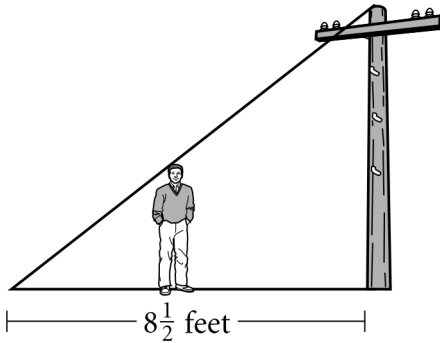
A. 15 feet   B. 17 feet   C. 20 feet   D. 80 feet

124. The diagram below shows the shape of Robin's original garden and the shape of the garden after it was expanded. The two shapes are similar.

15 ft.   Original Garden

x   Expanded Garden

6 ft.   9 ft.
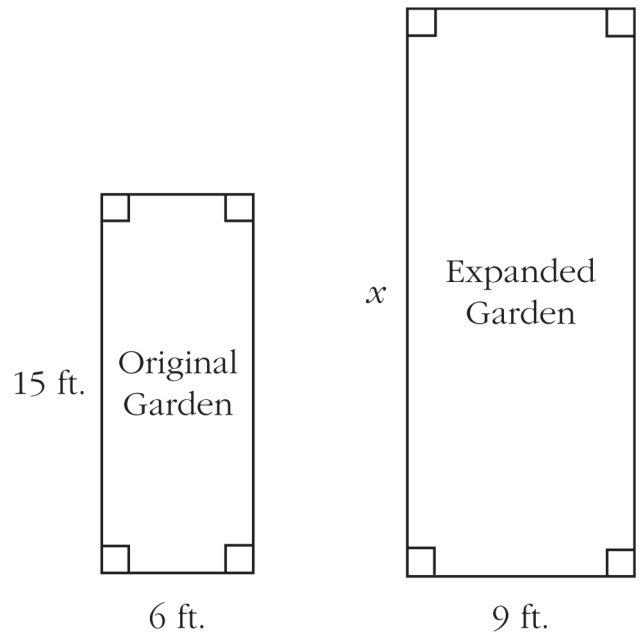
What is the length of the expanded garden (*x*)?

A. 3.6 ft.   B. 10 ft.   C. 18 ft.   D. 22.5 ft.

125. Mr. Lui wants to build a bridge across the creek that runs through his property. He made measurements and drew the map shown below.

Bridge

9 ft.

Creek

18 ft.

24 ft.

Based on this map, what is the distance across the creek at the place where Mr. Lui wants to put the bridge?

A. 9 feet   B. 12 feet   C. 18 feet   D. 24 feet

126. At 4:00 pm on a sunny day, a stick 2 feet tall casts a shadow 5 feet long. At the same time, a tree nearby casts a shadow 55 feet long.

2 feet

⊢— 5 feet —⊣

⊢———————— 55 feet ————————⊣

What is the height, in feet, of the tree?

A. 137.5 feet   B. 27.5 feet   C. 22 feet   D. 10 feet

127. Quadrilateral *ABCD* is a parallelogram. If adjacent angles are congruent, which statement must be true?

A. Quadrilateral *ABCD* is a square.

B. Quadrilateral *ABCD* is a rhombus.

C. Quadrilateral *ABCD* is a rectangle.

D. Quadrilateral *ABCD* is an isosceles trapezoid.

128. Parallelogram *WXYZ* and diagonal $\overline{WY}$ are shown in the diagram below.

Which of the following statements best proves that $\angle XWY \cong \angle ZYW$?

A. If two parallel lines are cut by a transversal, then corresponding angles are congruent.

B. If two parallel lines are cut by a transversal, then complementary angles are congruent.

C. If two parallel lines are cut by a transversal, then alternate interior angles are congruent.

D. If two parallel lines are cut by a transversal, then alternate exterior angles are congruent.

129. Stephanie drew a square on her graph paper. Then she drew all the possible diagonals contained within her square. Which statement about Stephanie's drawing is definitely *false*?

A. Each side of Stephanie's square is 4 units long.

B. The diagonals that Stephanie drew are all congruent to each other.

C. Stephanie drew 3 diagonals within her square.

D. All of the diagonals intersect at 90° angles.

130. Quadrilateral *WXYZ* is a kite. Which of the following *must* be true?

A. $\overline{WX}$ and $\overline{YZ}$ are congruent

B. $\overline{WY}$ and $\overline{XZ}$ bisect each other

C. $\overline{WY}$ and $\overline{XZ}$ are perpendicular

D. $\angle WXY$ and $\angle XYZ$ are congruent

131. Quadrilateral *PQRS* is shown below.

The following statements about quadrilateral *PQRS* are true:

- Line segment *QS* bisects angle *PSR*.
- Line segment *PS* is congruent to line segment *RS* ($\overline{PS} \cong \overline{RS}$).

Which mathematical theorem can be used to prove that triangle *PQS* is congruent to triangle *RQS* ($\triangle PQS \cong \triangle RQS$)?

A. SSS theorem   B. SAS theorem

C. AAS theorem   D. ASA theorem

132. Consider these statements:

- Every square is a rhombus.
- Quadrilateral *ABCD* is *not* a rhombus.

Which of these conclusions can be made using both statements?

A. *ABCD* is *not* a parallelogram.   B. *ABCD* is a rectangle.

C. *ABCD* is *not* a square.   D. *ABCD* is a trapezoid.

133. Which theorem can be used to prove that the triangles in the figure below are congruent?

  A.   side-by-side (SSS)
  B.   side-angle-side (SAS)
  C.   angle-side-angle (ASA)
  D.   angle-angle-side (AAS)

134. Which principle of congruence could be used to prove triangle *RST* is congruent to triangle *XYZ*?
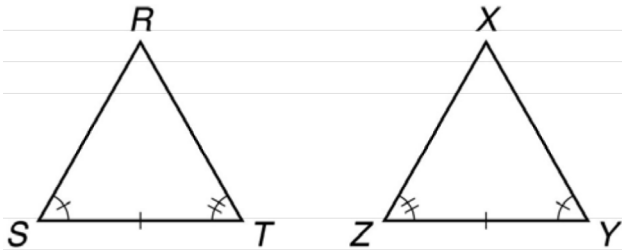
  A.   Side-Side-Side (SSS)
  B.   Side-Angle-Side (SAS)
  C.   Angle-Side-Angle (ASA)
  D.   Side-Side-Angle (SSA)

135. Which theorem of congruence should be used to prove $\triangle QRS \cong \triangle TUV$?
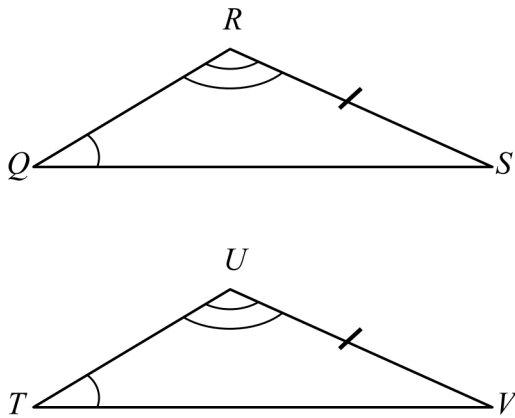
  A.   Angle-Side-Angle (ASA)
  B.   Angle-Angle-Side (AAS)
  C.   Side-Angle-Side (SAS)
  D.   Side-Side-Side (SSS)

136. Based on the diagram below, which of these arguments is valid?
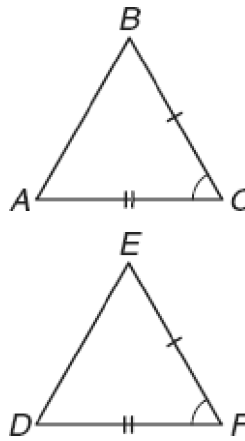
  A.   The triangles are congruent by side-side-side (SSS).
  B.   The triangles are congruent by side-angle-side (SAS).
  C.   The triangles are congruent by angle-side-angle (ASA).
  D.   The triangles are congruent by angle-angle-side (AAS).

137. In the diagram below, $\overline{RT}$ intersects $\overline{QU}$ at point *S*.
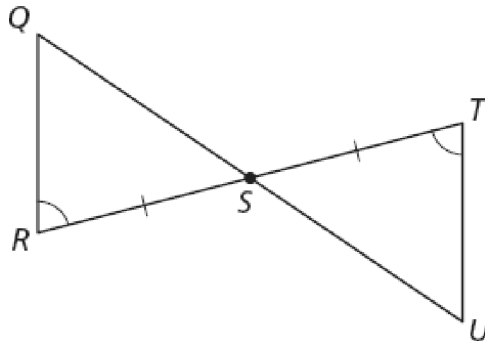
Which postulate should be used to prove that $\triangle RQS \cong \triangle TUS$?

  A.   Side–Side–Side
  B.   Angle–Side–Angle
  C.   Angle–Side–Side
  D.   Side–Angle–Side

138. Jan proved that the two triangles below are congruent.
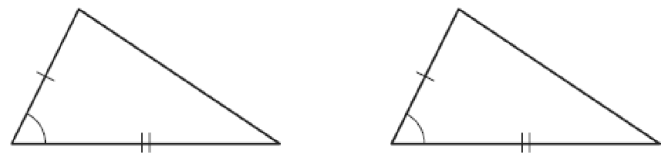
Which postulate did Jan use for her proof?

  A.   SSS (Side-Side-Side)
  B.   SAS (Side-Angle-Side)
  C.   AAS (Angle-Angle-Side)
  D.   ASA (Angle-Side-Angle)

139. Which method listed below would *not* be used to prove that two triangles are congruent?

    A. Prove all three sets of corresponding sides congruent.

    B. Prove all three sets of corresponding angles congruent.

    C. Prove that two sides and an included angle of one triangle are congruent to two sides and an included angle of the other triangle.

    D. Prove that two angles and an included side of one triangle are congruent to two angles and an included side of the other triangle.

140. Can we prove $\triangle LMN$ is congruent to $\triangle XYZ$? Is so, which postulate can we use to do so?
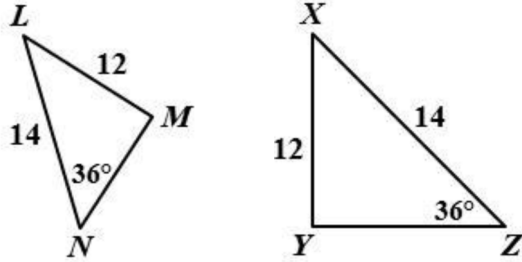
    A. Yes, we can prove they are congruent using the SAS postulate.

    B. Yes, we can prove they are congruent using the ASA postulate.

    C. No, we cannot prove they are congruent because $\triangle XYZ$ appears to be a right triangle and $\triangle LMN$ is not a right triangle.

    D. No, we cannot prove they are congruent because none of the three postulates can be used.

141. If two angles of one triangle are congruent to two angles of another triangle, then the remaining angle in one triangle is congruent to the remaining angle in the other. Which of the following makes this statement true?
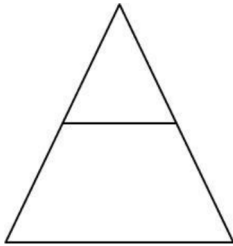
    A. The definition of supplementary angles.

    B. The angle sum theorem for triangles.

    C. SSS postulate.

    D. The definition of congruent triangles.

142. As marked, by which method would it be possible to prove these triangles are similar (if possible)?
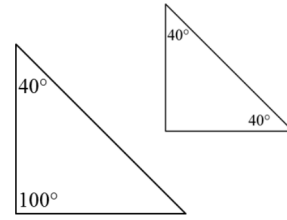
    A. AA   B. SSS   C. SAS   D. Not similar

143. Ricardo makes sails for sailboats. A customer places an order for a right triangle sail, as shown below.
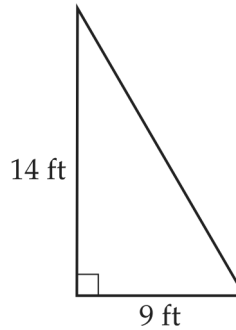
Note: The figure is not drawn to scale.

Which theorem guarantees that all triangles with the measurements shown above will be congruent?

    A. Angle-Angle-Side (AAS)   B. Side-Angle-Side (SAS)

    C. Angle-Side-Angle (ASA)   D. Side-Side-Side (SSS)

144. It is given that $\overline{AC} \cong \overline{AD}$ and $\angle CAB \cong \angle DAB$. By the reflexive property of congruent segments, $\overline{AB} \cong \overline{AB}$.
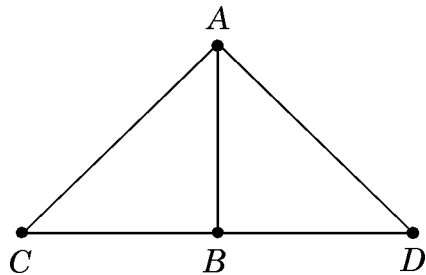
Which reason could be used to prove $\triangle ABC \cong \triangle ABD$?

    A. side-angle-side   B. hypotenuse-leg

    C. side-side-side   D. angle-side-angle

145. Quadrilateral *ABCD* is shown below.
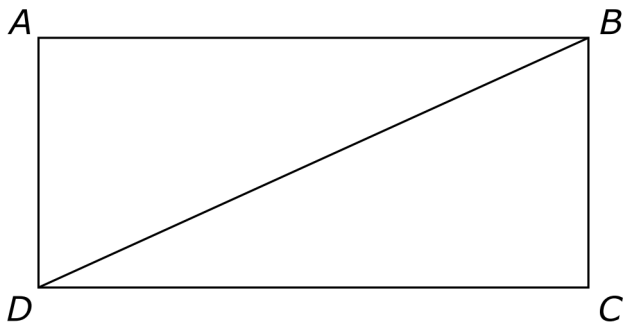
If $\overline{AB} \parallel \overline{CD}$ and $\overline{AB} \cong \overline{CD}$, which is a reason for $\triangle ABD \cong \triangle CDB$?

A. Side-Angle-Side Postulate   B. Angle-Angle Postulate

C. Hypotenuse-Leg Theorem   D. Angle-Angle-Side Theorem

146. Given: $\overline{AB}$ and $\overline{CD}$ intersect at point *E*;
$\angle 1 \cong \angle 2$
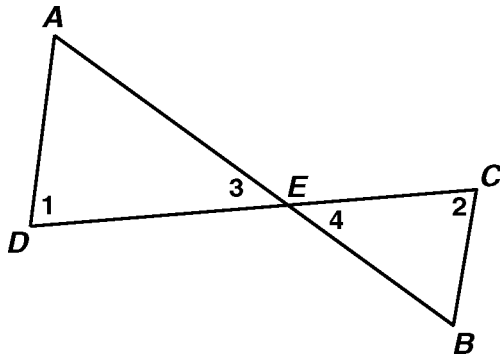
Which theorem or postulate can be used to prove $\triangle AED \sim \triangle BEC$?

A. AA   B. SSS   C. ASA   D. SAS

147. In the diagram below $\overline{BP} \cong \overline{PK}$ and $\overline{AP} \cong \overline{PJ}$.
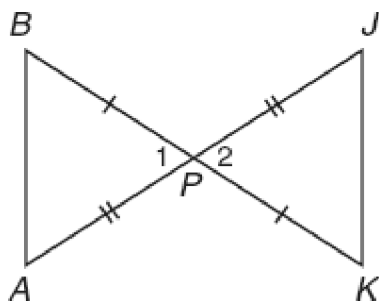
What additional information is sufficient to prove $\triangle APB \cong \triangle JPK$ by side-angle-side (SAS)?

A. $\angle A \cong \angle K$ B. $\angle B \cong \angle J$ C. $\angle 1 \cong \angle K$ D. $\angle 1 \cong \angle 2$

148. Use the figure below to answer the following question(s).
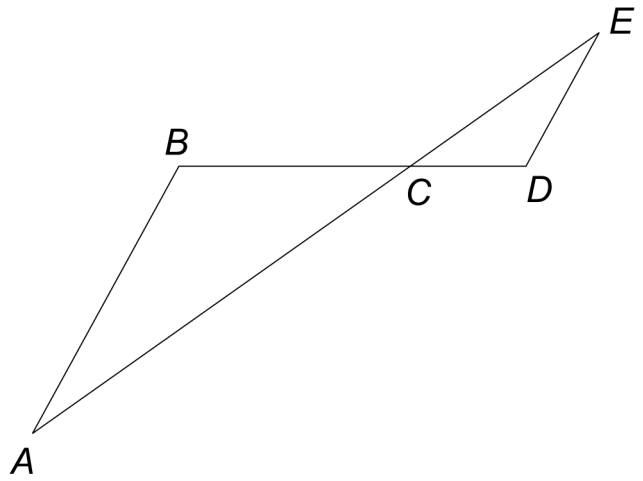
Which of the following statements gives enough additional information about the figure above to prove that $\triangle ABC$ is similar to $\triangle EDC$?

A. $\overline{BC}$ is the same length as $\overline{EC}$.   B. $\overline{BC}$ is twice as long as $\overline{CD}$.

C. $\angle B$ is congruent to $\angle D$.   D. $\angle BCA$ is congruent to $\angle CED$.

149. Triangles *KOL* and *MON* are shown below. $\angle K \cong \angle M$ and $\overline{KL} \cong \overline{MN}$.
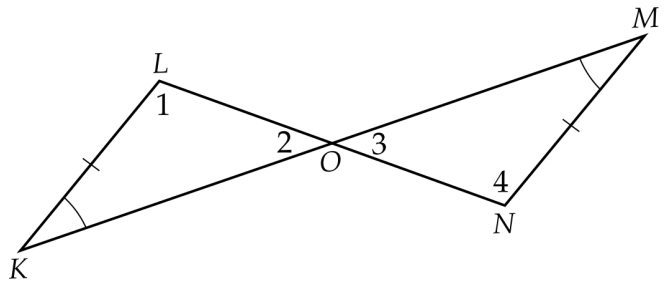
Which of these is needed to prove that the triangles are congruent by Angle-Side-Angle (ASA)?

A. $\angle 1 \cong \angle 4$ B. $\angle 1 \cong \angle 3$ C. $\angle 2 \cong \angle 4$ D. $\angle 2 \cong \angle 3$

150. Which parts must be congruent to prove $\triangle PQR = \triangle PSR$ by *SAS*?
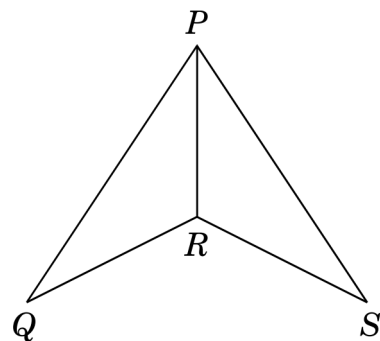
A. $\angle Q \cong \angle S$ and $\overline{QP} \cong \overline{SP}$ B. $\angle Q \cong \angle S$ and $\overline{QR} \cong \overline{SR}$

C. $\angle QRP \cong \angle SRP$ and $\overline{QP} \cong \overline{SP}$ D. $\angle QPR \cong \angle SPR$ and $\overline{QP} \cong \overline{SP}$

Similarity, congruence and Proofs (unit 2)

151. Triangles *LMN* and *OPQ* are shown below.
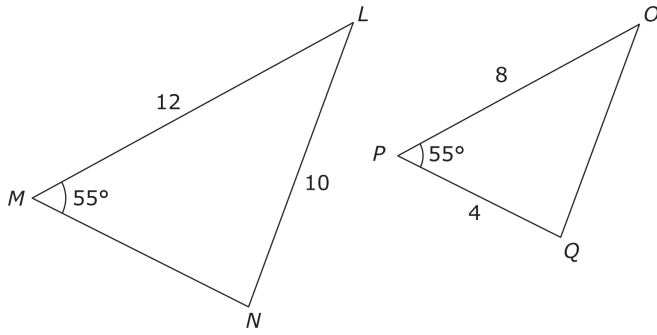
What additional information is sufficient to show that △*LMN* can be transformed and mapped onto △*OPQ*?

A. $OQ = 6$ B. $MN = 9$

C. $\angle LMN \cong \angle QOP$ D. $\angle NLM \cong \angle QOP$

152. Use the proof to answer the question below.

Given: $\overline{AB} \cong \overline{BC}$; *D* is the midpoint of $\overline{AC}$

Prove: △*ABD* ≅ △*CBD*
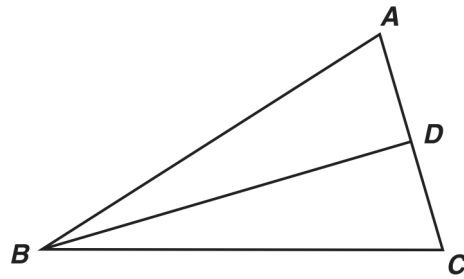
Statement	Reason
1. $\overline{AB} \cong \overline{BC}$; *D* is the midpoint of $\overline{AC}$	1. Given
2. $\overline{AD} \cong \overline{CD}$	2. Definition of Midpoint
3. $\overline{BD} \cong \overline{BD}$	3. Reflexive Property
4. △*ABD* ≅ △*CBD*	4. ?

What reason can be used to prove that the triangles are congruent?

A. AAS   B. ASA   C. SAS   D. SSS

153. Which statement and reason complete the proof below?
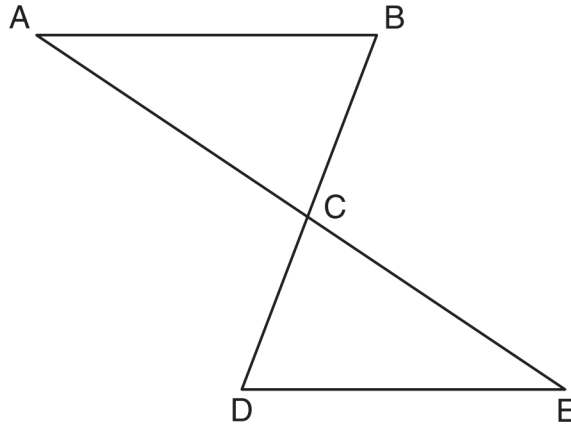
Statements	Reasons
1) $\overline{AB} \parallel \overline{DE}$; *C* is a midpoint $\overline{AE}$	1) Given
2) $\overline{AC} \cong \overline{CE}$	2) Definition of a midpoint
3) $\angle BAC \cong \angle DEC$	3) If two parallel lines are cut by a transversal, then alternate interior angles are congruent.
4) $\angle ACB \cong \angle ECD$	4) Vertical Angle Theorem
5)	5)
6) $\overline{BC} \cong \overline{CD}$	6) Corresponding parts of congruent triangles are congruent.

A.   △*ABC* ≅ △*EDC*; SAS

B.   △*ABC* ≅ △*EDC*; ASA

C.   *C* is the midpoint of $\overline{BD}$; definition of a midpoint

D. $\overline{AB} \cong \overline{ED}$; corresponding parts of congruent triangles are congruent

           Similarity, congruence and Proofs (unit 2)

154. Given: $\angle M \cong \angle N$, $\overline{LO} \cong \overline{PO}$

Prove: $\triangle MOL \cong \triangle NOP$
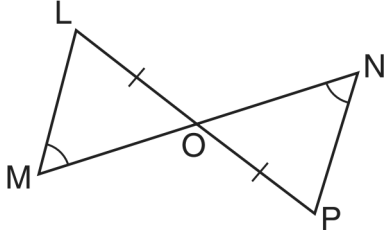
Statements	Reasons
1) $\angle M \cong \angle N$	1) Given
2) $\overline{LO} \cong \overline{PO}$	2) Given
3) $\angle MOL \cong \angle NOP$	3)
4) $\triangle MOL \cong \triangle NOP$	4) AAS

Which of these reasons would be appropriate for statement 3?

A.   reflexive property

B.   definition of midpoint

C.   Vertical angles are congruent.

D.   Corresponding parts of congruent triangles are congruent.

155. Given: $\overline{AD} \parallel \overline{EC}$, $\overline{AD} \cong \overline{EC}$

Prove: $\overline{AB} \cong \overline{CB}$
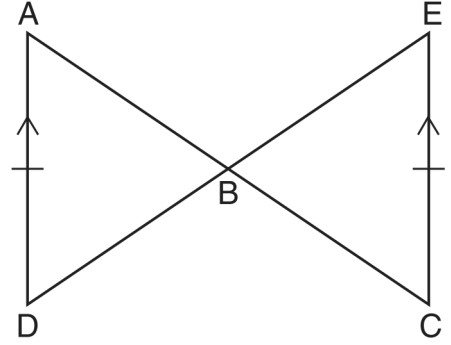
Shown below are the statements and reasons for the proof. They are not in the correct order.

Statement	Reason
I. $\triangle ABD \cong \triangle CBE$	I. AAS
II. $\angle ABD \cong \angle EBC$	II. Vertical angles are congruent.
III. $\overline{AD} \parallel \overline{EC}$, $\overline{AD} \cong \overline{EC}$	III. Given
IV. $\overline{AB} \cong \overline{CB}$	IV. Corresponding parts of congruent triangles are congruent.
V. $\angle DAB \cong \angle ECB$	V. If two parallel lines are cut by a transversal, the alternate interior angles are congruent.

Which of these is the most logical order for the statements and reasons?

A.   I, II, III, IV, V

B.   III, II, V, I, IV

C.   III, II, V, IV, I

D.   II, V, III, IV, I

Similarity, congruence and Proofs (unit 2)

Similarity, congruence and Proofs (unit 2)   XXXX-XX-XX

1.
Answer: D

2.
Answer: B

3.
Answer: D

4.
Answer: A

5.
Answer: D

6.
Answer: A

7.
Answer: D

8.
Answer: A

9.
Answer: A

10.
Answer: B

11.
Answer: C

12.
Answer: D

13.
Answer: [answer grid]

14.
Answer: B

15.
Answer: C

16.
Answer: A

17.
Answer: 50

18.
Answer: D

19.
Answer: C

20.
Answer: 50°

21.
Answer: B

22.
Answer: B

23.
Answer: C

24.
Answer: C

25.
Answer: C

26.
Answer: B

27.
Answer: 45°

28.
Answer:

29.
Answer: C

30.
Answer: C

31.
Answer: 30

32.
Answer: A

33.
Answer: D

34.
Answer: D

35.
Answer: D

36.
Answer: D

37.
Answer: A

38.
Answer: A

39.
Answer: B

40.
Answer: A

41.
Answer: A

42.
Answer: B

43.
Answer: A

44.
Answer: D

45.
Answer: D

46.
Answer: D

47.
Answer: B

48.
Answer: D

49.
Answer: C

50.
Answer: 160 feet

51.
Answer: C

52.
Answer: B

53.
Answer: B

54.
Answer: D

55.
Answer: B

56.
Answer: B

57.
Answer: B

58.
Answer: A

59.
Answer: B

60.
Answer: A

61.
Answer: B

62.
Answer: C

63.
Answer:

64.
Answer: A

65.
Answer: C

66.
Answer: C

67.
Answer: A

68.
Answer: B

69.
Answer:

70.
Answer: C

71.
Answer: B

72.
Answer: D

73.
Answer: B

74.
Answer: A

75.
Answer: C

76.
Answer: A

77.
Answer: A

78.
Answer: C

79.
Answer: C

80.
Answer:

81.
Answer: C

82.
Answer: B

83.
Answer: D

84.
Answer: B

85.
Answer: A

86.
Answer: D

87.
Answer: C

88.
Answer: B

89.
Answer: A

90.
Answer: B

91.
Answer: B

92.
Answer: D

93.
Answer:

94.
Answer: A

95.
Answer: C

96.
Answer: A

97.
Answer: D

98.
Answer: D

99.
Answer: D

100.
Answer: D

101.
Answer: D

102.
Answer: C

103.
Answer: D

104.
Answer: D

105.
Answer: D

106.
Answer: A

107.
Answer: C

108.
Answer: D

109.
Answer:

110.
Answer: D

111.
Answer:

112.
Answer: A

113.
Answer: A

114.
Answer:

115.
Answer: A

116.
Answer: A

117.
Answer: C

118.
Answer: B

119.
Answer: D

120.
Answer: B

121.
Answer: B

122.
Answer: C

123.
Answer: B

124.
Answer: D

125.
Answer: B

126.
Answer: C

127.
Answer: C

128.
Answer: C

129.
Answer: C

130.
Answer: C

131.
Answer: B

132.
Answer:

133.
Answer: B

134.
Answer: C

135.
Answer: B

136.
Answer: B

137.
Answer: B

138.
Answer: B

139.
Answer: B

140.
Answer: D

141.
Answer: A

142.
Answer: A

143.
Answer:

144.
Answer: A

145.
Answer: A

146.
Answer: A

147.
Answer: D

148.
Answer: C

149.
Answer:

150.
Answer: D

151.
Answer: D

152.
Answer: D

153.
Answer: B

154.
Answer: C

155.
Answer: B