1. Point, line, and plane
2. **B**
3. **D**
4. **B**
5. $\overline{AB}$
6. –3 and 13
7. 30
8. 8
9. 20
10. 130
11. 12
12. 10
13. 25
14. 25

15a. $\overline{EG} \cong \overline{FH}$

15b. 43

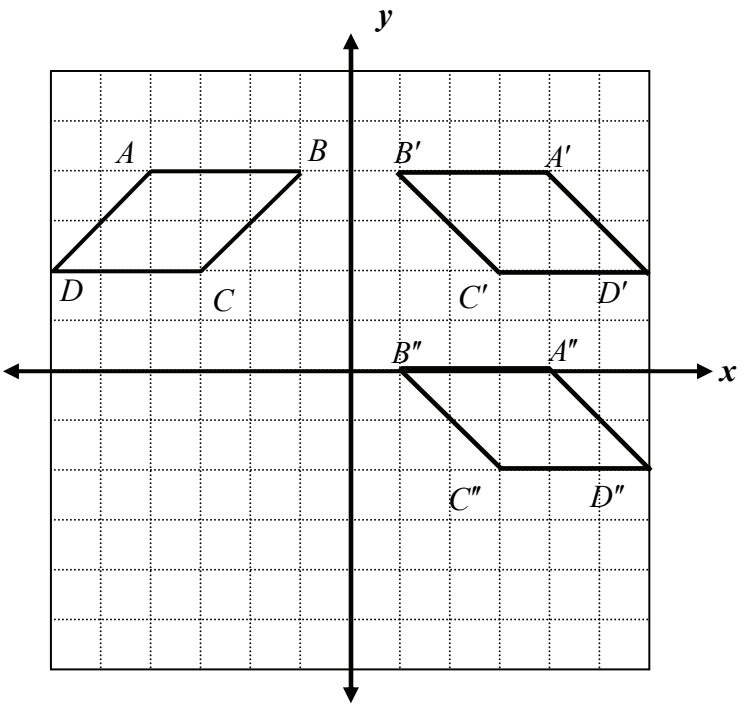
16. 55^{o}
17. 30
18. 110^{o}

19a. 5

19b. 30^{o}

20. $x = 20, y = 80$
21. $F(x, y) = (x, -y)$
22. $F(x, y) = (-x, y)$
23. $F(x, y) = (y, x)$
24. $F(x, y) = (-x, -y)$
25. $F(x, y) = (x + 5, y - 3)$
26. **C**

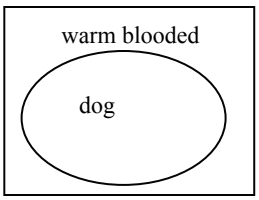
27a.
27b.



27c. $C'(3,2), C''(3,-2)$

27d. $P''(x,y) = (-x, y-4)$ The reflection across the y-axis makes the x-coordinate the opposite, while the translation downward subtracts 4 from the y-coordinate.

28a.

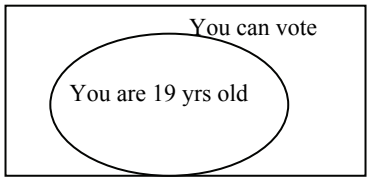


28b. If an animal is warm-blooded, then the animal is a dog.

28c. If an animal is not a dog, then the animal is not warm-blooded.

28d. If an animal is not warm-blooded, then the animal is not a dog.

29a.



29b. If X represents a voter, then the X is inside the box. It may or may not be in the oval, so the statement is not necessarily true.

30. If Chris earns $10, then he will bring Jane.

31. Triangle *ABC* is equiangular.

32. Sally does not study for the test.

33. **C**

34. Inductive reasoning

35. Inductive reasoning

36. Deductive reasoning

37. Deductive reasoning

38. Inductive reasoning

39. If it is sunny outside today, I will go to the store
If I go to the store, I will buy candy
If I buy candy, I will not eat my dinner.

40a. 4

40b. 8

40c. an infinite number

41. Charlie is correct. The basic rotational symmetry is 360 degrees divided by the number of sides. $360 \div 6 = 60$, so any multiple of 60 degrees will work.

42. **A**

43.

Property	Parallelogram	Rectangle	Square	Rhombus	Trapezoid
Opposite sides congruent	x	x	x	x	
Only one pair of opposite sides parallel					x
Opposite angles congruent	x	x	x	x	
Each diagonal forms 2 congruent triangles	x	x	x	x	
Diagonals bisect each other	x	x	x	x	
Diagonals congruent		x	x		
Diagonals perpendicular			x	x	
A diagonal bisects two angles			x	x	
All angles are right angles		x	x		
All sides are congruent			x	x	

44. 85

45. $x = 20, y = 110$

46a. lines *n* and *p*. Corresponding angles are congruent.

46b. lines *l* and *m*. Alternate interior angles are congruent.

46c. lines *l* and *m*. Adjacent interior angles are supplementary.

47. 5

48. **C**

49. 540^o

50. 156^o

51. 40^o

52. 8 sides

53. 6 sides

54. 4,5,6,7,8,9,10,11,12,13,14

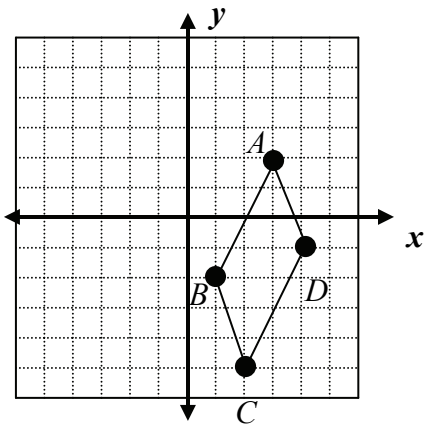
55. $y = 110$

56. 36^o

57. $x = 20$

58. $x = 30$

59.



- The quadrilateral is a parallelogram.
  The slopes of $\overline{AB}$ & $\overline{CD}$ equal 2, so $\overline{AB} \parallel \overline{CD}$.
  The slopes of $\overline{AD}$ & $\overline{BC}$ equal –3, so $\overline{AD} \parallel \overline{BC}$.
- The quadrilateral is not a rectangle or a square, since the slopes of $\overline{AD}$ & $\overline{CD}$ are not opposite reciprocals (do not have a product of –1).
- The quadrilateral is not a rhombus since the slopes of the diagonals are not opposite reciprocals. $m\overline{BD} = \frac{1}{3}, m\overline{AC} = 7$.

60a. 3 parallelograms

60b. $(-1,-1)$, $(3,3)$, and $(-5,-1)$

61. The triangle is a right triangle. $m\overline{AB} = \frac{2}{7}, m\overline{AC} = -\frac{7}{2}$. So $\overline{AB} \perp \overline{AC}$.

62. $(3.5,13)$

63a. SAS

63b. cannot be proven congruent

63c. ASA

63d. SSS

63e. cannot be proven congruent

63f. AAS

64. Corresponding parts of congruent figures are congruent.

65. A two-column proof is given. A paragraph or flowchart proof is also acceptable.

Statements	Reasons
1. $\overline{BD}$ is the perp. bisector of $\overline{AC}$	1. Given
2. $\angle BEA$ and $\angle BEC$ are right angles	2. Definition of perpendicular
3. $\angle BEA \cong \angle BEC$	3. All right angles are congruent
4. $\overline{AE} \cong \overline{EC}$	4. Definition of bisector
5. $\overline{BE} \cong \overline{BE}$	5. Reflexive Property of Congruence
6. $\triangle BEA \cong \triangle BEC$	6. SAS
7. $\angle BAC \cong \angle BCA$	7. CPCTC

66. A 2-column proof is given. A paragraph or flowchart proof is also acceptable.

Statements	Reasons
1. $\overline{BD} \parallel \overline{EG}$	1. Given
2. $\angle BCF \cong \angle CFG$	2. If 2 $\parallel$ lines are cut by a transversal, alternate interior angles are congruent.
3. $\overline{BC} \cong \overline{FG}$	3. Given
4. $\overline{CF} \cong \overline{CF}$	4. Reflexive property of congruence
5. $\triangle BCF \cong \triangle GFC$	5. SAS
6. $\angle CBF \cong \angle CGF$	6. CPCTC

Alternative proof: Given that $\overline{BD} \parallel \overline{EG}$ and $\overline{BC} \cong \overline{FG}$, then one pair of opposite sides of quadrilateral BCFG is parallel and congruent. Therefore BCFG is a parallelogram. Since opposite angles of a parallelogram are congruent, then $\angle CBF \cong \angle CGF$.

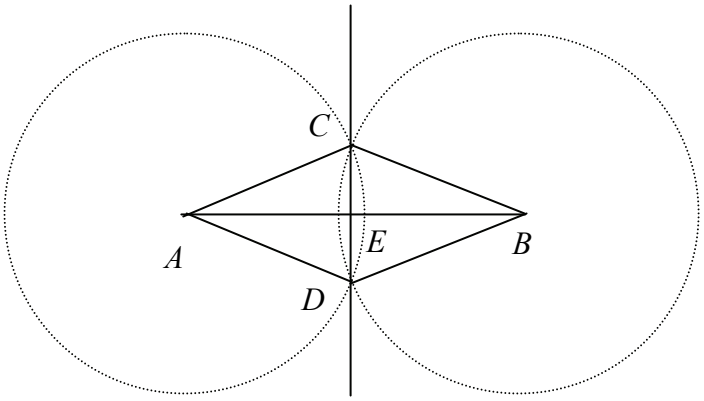
67a. parallelogram

67b. rhombus

67c. rectangle

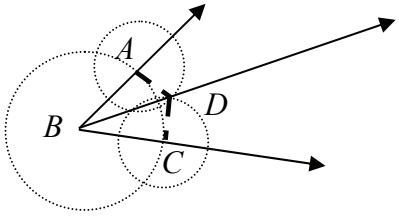
67d. none of the figures

68a.



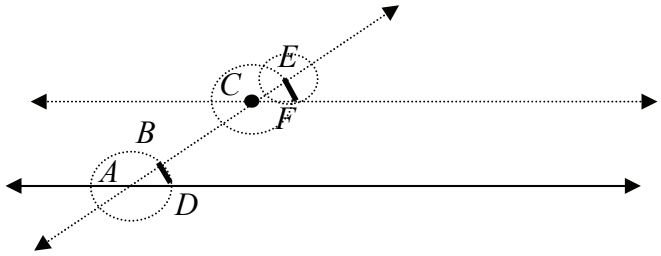
Justification: Congruent circles were constructed with centers at points A and B. Since radii of congruent circles are congruent, $\overline{AC} \cong \overline{BC} \cong \overline{AD} \cong \overline{BD}$; therefore $ACBD$ is a rhombus. In the rhombus, the diagonals are perpendicular, therefore $\overline{AB} \perp \overline{CD}$. Since ACBD is a parallelogram the diagonals bisect each other. Therefore $\overline{AE} \cong \overline{EB}$, so $\overline{CD}$ is the perpendicular bisector of $\overline{AB}$.

68b.



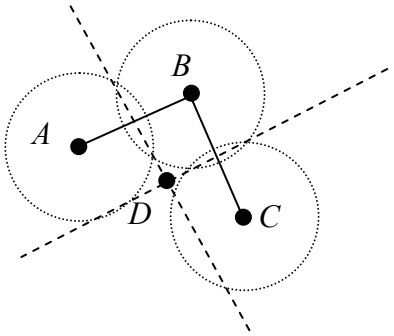
Justification: $\overline{AB} \cong \overline{BC}$ since they are the radii of the same circle. $\overline{AD} \cong \overline{DC}$ since they are constructed using the same compass setting. $\overline{BD} \cong \overline{BD}$ by the reflexive property of congruence. Therefore $\triangle ABD \cong \triangle CBD$
by SSS. $\angle ABD \cong \angle CBD$ by CPCTC, and by the definition of angle bisector
$\overrightarrow{BD}$ bisects $\angle$ABC.

68c.



Justification: $\overline{AB} \cong \overline{CE}, \overline{AD} \cong \overline{CF}$ since they were drawn by the same compass setting. $\overline{BD} \cong \overline{EF}$ since they were drawn with the same compass setting. Therefore $\triangle BAD \cong \triangle ECF$ by SSS. Therefore $\angle BAD \cong \angle ECF$ by CPCTC. Finally by the converse of the corresponding angles postulate, $\overleftrightarrow{CF} \,//\, \overleftrightarrow{AD}$.

68d.



Justification. I drew segments between A and B and B and C. I constructed the perpendicular bisector of $\overline{AB}$. Every point on that line is equidistant from points A and B. I constructed the perpendicular bisector of $\overline{BC}$. Every point on that line is equidistant from points B and C. Therefore, point D, the intersection of those two perpendicular bisectors, is equidistant from points A, B, and C.

69. **D**

70. **B**