$\qquad$
State whether each sentence is true or false. If it is false, replace the underlined word or phrase to make a true sentence.

1. If a parallelogram is a rectangle, then the diagonals are congruent.
2. A midsegment of a trapezoid is a segment that connects any two nonconsecutive vertices.
3. The diagonals of a rhombus are perpendicular.
4. A rectangle is not always a parallelogram.
5. A rectangle that is also a rhombus is a kite.

Find the sum of the measures of the interior angles of each regular convex polygon. Then find the measure of ONE interior angle. Round to the nearest tenth if necessary.
6. decagon
7. 15-gon
8. heptagon

Find the sum of the measures of the exterior angles of each regular convex polygon. Then find the measure of ONE exterior angle.
9. dodecagon
10. 18-gon
11. hexagon

The measure of an interior angle of a regular polygon is given. Find the number of sides in the polygon. Round to the nearest whole number if necessary.
12. 135
13. 166.15
14. 160

Use $\square A B C D$ to find each measure.
15. $\mathrm{m} \angle \mathrm{ADC}$
16. $A D$
17. AB
18. $m \angle B C D$


Given that 19-21 are parallelograms, find the value of each variable by writing an equation and showing all work.

$$
19 .
$$



Determine whether each quadrilateral is a parallelogram. JUSTIFY your answer.

24.

25.

26. a) Quadrilateral $A B C D$ is a rectangle. If $A G=6 k+44$ and $D G=8 k+16$, find $k$. Show all your work.

b) Justify how you found your answers by listing 2 properties of special quadrilaterals that you used.
27. Find $\mathrm{m} \angle \mathrm{SQP}$ in square PQRS.

28. Find the measure of $f=$ $\qquad$


## Quadrilateral EFGH is a rectangle.

29. If $\mathrm{m} \angle \mathrm{FEG}=57$, find $\mathrm{m} \angle \mathrm{GEH}$.
30. If $\mathrm{m} \angle \mathrm{HGE}=13$, find $\mathrm{m} \angle \mathrm{FGE}$.
31. If $F K=32 \mathrm{ft}$, find $E G$.
32. Find $\mathrm{m} \angle \mathrm{HEF}+\mathrm{m} \angle E F G$.

$A B C D$ is a rhombus. If $E B=9, A B=12$, and $m \angle A B D=55$, find each measure.
33. AE
34. $\mathrm{m} \angle \mathrm{BDA}$
35. CE
36. $\mathrm{m} \angle \mathrm{ACB}$


## Quadrilateral ABCD is an isosceles trapezoid.

37. Which angle is congruent to $\angle \mathrm{BCD}$ ?
38. Which side is parallel to $\overline{\mathbf{A B}}$ ?
39. Which segment is congruent to $\overline{\mathbf{A C}}$ ?


Quadrilateral MNOP is a rhombus. Find each value or measure. 40. $m \angle M R N$
41. If $P R=12$, find $R N$.
45. If $\mathrm{m} \angle \mathrm{PON}=124$, find $\mathrm{m} \angle \mathrm{POM}$.

## Find each measure.


44. $m \angle Z$

45. $m \angle D$


46. PO

47. Which statement is true?
a) All rectangles are squares
b) all rhombi are squares
c) All rectangles are parallelograms
d) All parallelograms are rectangles
48. Quadrilateral ABCD is a parallelogram. Find the value of $x$.


Graph QRST and then determine what kind of parallelogram you made. List ALL that apply.
EXPLAIN your answer and SHOW ALL WORK. (Slopes, distances, etc)
49. $\mathrm{Q}(12,0), \mathrm{R}(6,-6), \mathrm{S}(0,0), \mathrm{T}(6,6)$

50. $\mathrm{Q}(-2,4), \mathrm{R}(5,6), \mathrm{S}(12,4), \mathrm{T}(5,2)$


## Use the graph to answer each question.

51. Find the length of diagonal $\overline{\mathbf{S U}}$. Use the Distance Formula to verify your answer.
52. Find the slope of $\overline{\mathbf{R U}}$. 53. Find the length of side $\overline{\mathbf{R U}}$.

53. What is the midpoint of $\overline{\mathbf{S U}}$ ? Use the Midpoint Formula to verify your answer.
54. What type of quadrilateral is RSTU? Justify by using the properties and/or definitions for this type of quadrilateral.
55. Which formula or formulas do you need to use to prove that a quadrilateral forms a parallelogram?
a) Slope Formula
b) Distance Formula or Slope Formula or Midpoint Formula
c) Distance Formula
d) Slope Formula and Midpoint Formula
56. State TWO things that are true of a rhombus that are NOT true of a "generic" parallelogram.

57. State TWO properties of KITES

Answers: 1. True 2. False, diagonal 3. True 4. False, always 5. False, square 6. 1440, 144 7. 2340,156 $\begin{array}{llllllllllllll}\text { 8. } 900,128.6 & 9.360,30 & 10.360,20 & 11.360,60 & 12.8 & 13.26 & 14.18 & 15 . & 65 & 16.18 & 17 . & 12 & 18 . & 115\end{array}$ 19. $5 y=60, y=12, x+4=3 x-6, x=5 \quad$ 20. $2 x+41=115, x=37,2 y+19=3 y+13, y=6 \quad 21 . \quad 12 x-8=14 x-34$, $x=13$ 22. $11 x+30=360, x=30 \quad$ 23. Yes diagonals bisect each other 24. Yes 1 pair of opp sides is both // and $\cong$. 25. no consec sides are $\cong$, not opposite sides 26 a ) $6 k+44=8 k+16, k=14$ b) diagonals of parallelograms bisect each other and diagonals of rectangles are $\cong 27.45 \quad 28.60$ 29. 33 30. 77 31. 64 ft 32. $180 \quad 33 . \sqrt{\mathbf{6 3}}=\mathbf{3} \sqrt{\mathbf{7}} \approx \mathbf{7 . 9}$
34. 55
35. $\sqrt{63} \approx 7.9$
36. 35
37. $\angle \mathrm{ADC}$
38. $\overline{\mathrm{DC}}$
39. $\overline{\mathbf{B D}}$
40. 90
41. 12
42. 62
43. $\sqrt{369} \approx 19.2$
44. 68
45. 122 46. 8
47. C
48. 50
49. Slopes: $\mathrm{ST}=1, \mathrm{RQ}=1, \mathrm{TQ}={ }^{-1}, \mathrm{SR}={ }^{-1}$ opposite sides parallel means this is a parallelogram. Consec sides $\perp$ means it is also a rectangle. Distances: $\mathrm{ST}=\sqrt{\mathbf{7 2}}=\mathbf{6} \sqrt{\mathbf{2}}, \mathrm{RQ}=\sqrt{\mathbf{7 2}}=\mathbf{6} \sqrt{\mathbf{2}}$, $\mathrm{TQ}=\sqrt{72}=6 \sqrt{2}, \mathrm{SR}=\sqrt{72}=6 \sqrt{2}$ all sides $\cong$ means it is also a rhombus and a square. 50. Slopes: $\mathrm{QR}=\frac{2}{7}, \mathrm{TS}=\frac{2}{7}$, $\mathrm{RS}=-\frac{2}{7}$, QT $=\frac{-2}{7}$ opposite sides parallel means this is a parallelogram. Consec sides are not $\perp$ Distances: $\mathrm{QR}=\sqrt{53}$, $\mathrm{RS}=\sqrt{53}, \mathrm{ST}=\sqrt{53}, \mathrm{QT}=\sqrt{53}$, all sides $\cong$ means it is also a rhombus. 51. $\sqrt{136}=2 \sqrt{34} \quad 52.3 \quad 53 . \sqrt{40}=2 \sqrt{10}$ 54. $(0,-1)$ 55. midpt of $R T=(0,-1)$ parallelogram - diagonal bisect each other 56. B 57. All sides $\cong$, diagonals are $\perp$ 58. diagonals are $\perp$ and 2 pairs of consec sides $\cong$ (or exactly 1 pair of opp angles $\cong$ )

