

Find the sum of the measures of the interior angles of each convex polygon.

1. 36-gon

$$180(36-2) = (6120)$$

2. 11-gon

$$180(11-2) = (1620)$$

The measure of the interior angle of a regular polygon is given. Find the number of sides in each polygon.

3. 171

$$171n = 180(n-2)$$

$$171n = 180n - 360$$

$$-9n = -360$$

$$n = 40$$

4. 108

$$108n = 180(n-2)$$

$$108n = 180n - 360$$

$$-72n = -360$$

$$n = 5$$

For 5-6, find the measures of an interior angle and an exterior angle given the number of sides of a regular polygon. Round to the nearest tenth.

5. 16

$$360/16 = 22.5^\circ - \text{Ext}$$

$$157.5^\circ - \text{Int}$$

6. 38

$$360/38 = 9.5^\circ - \text{Ext}$$

$$170.5^\circ - \text{Int}$$

7. Find the sum of the measures of the exterior angles of a 109-gon.

$$360$$

8) A convex octagon has interior angles with measures $(x + 55)^\circ$, $(3x + 20)^\circ$, $(4x)^\circ$, $(4x - 10)^\circ$, $(6x - 55)^\circ$, $(3x + 52)^\circ$, $(3x)^\circ$, and $(2x + 30)^\circ$. Find x .

$$180(8-2) = 1080$$

$$x + 55 + 3x + 20 + 4x + 4x - 10 + 6x - 55 + 3x + 52 + 3x + 2x + 30 = 1080$$

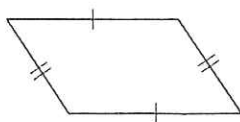
$$26x + 92 = 1080$$

$$26x = 988$$

$$x = 38$$

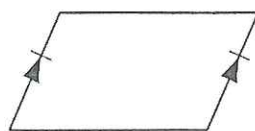
Determine whether each quadrilateral is a parallelogram. Justify your answer.

9.



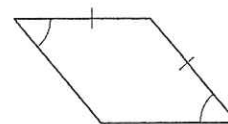
Yes, bc both pairs of opp sides are \cong

10.



Yes, bc one pair of opp sides are \parallel & \cong

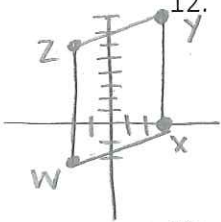
11.



No, only one pair of opp \angle s are \cong

Determine whether a figure with the given vertices is parallelogram. Use the method indicated.

12. X(3, 0), Y(3, 8), Z(-2, 6), and W(-2, -2); Slope Formula



$$\text{Slope } ZY = \frac{8-6}{3-2} = \frac{2}{1} = 2$$

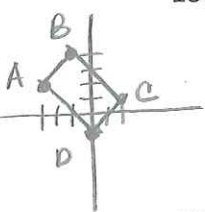
$$\text{Slope } WX = \frac{-2-0}{-2-3} = \frac{-2}{-5} = \frac{2}{5}$$

$$\text{Slope } ZW = \frac{-2-6}{-2-2} = \frac{-8}{0} = \text{und}$$

$$\text{Slope } YX = \frac{8-0}{3-3} = \frac{8}{0} = \text{und}$$

Yes, bc opp sides are //

13. A(-3, 2), B(-1, 4), C(2, 1), D(0, -1); Distance and Slope Formulas



$$\text{Slope } AB = \frac{4-2}{-1-3} = \frac{2}{-4} = -\frac{1}{2}$$

$$\text{Slope } CD = \frac{-1-1}{0-2} = \frac{-2}{-2} = 1$$

$$AB = \sqrt{(-3+1)^2 + (2-4)^2} = \sqrt{4+4} = \sqrt{8}$$

$$CD = \sqrt{(2-0)^2 + (1-(-1))^2} = \sqrt{4+4} = \sqrt{8}$$

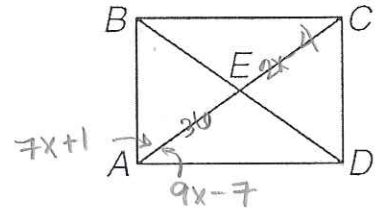
ABCD is a rectangle.

Yes, bc one pair of opp sides are // & \cong

14. If AE = 36 and CE = 2x - 4, find x.

$$36 = 2x - 4 \quad (20 = x)$$

$$40 = 2x$$



15. If $m\angle BAC = 7x + 1$ and $m\angle CAD = 9x - 7$, find $m\angle BAC$.

$$7x + 1 + 9x - 7 = 90$$

$$16x - 6 = 90$$

parallelogram

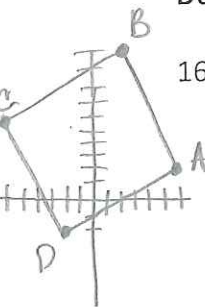
$$16x = 96$$

$$x = 6$$

$$7(6) + 1 = 43^\circ$$

Determine whether ABCD is a rectangle given each set of vertices. Justify your answer.

16. A(6, 2), B(2, 10), C(-6, 6), D(-2, -2)



$$AC = \sqrt{(6-(-6))^2 + (2-6)^2}$$

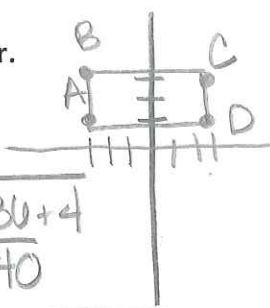
$$= \sqrt{144 + 16} = \sqrt{160}$$

$$BD = \sqrt{(-2-2)^2 + (10-2)^2}$$

$$= \sqrt{16 + 144} = \sqrt{160}$$

Yes, bc diags are \cong

17. A(-3, 1), B(-3, 3), C(3, 3), D(3, 1)



$$AC = \sqrt{(3-(-3))^2 + (3-1)^2} = \sqrt{36 + 4} = \sqrt{40}$$

$$BD = \sqrt{(3-(-3))^2 + (1-3)^2} = \sqrt{36 + 4} = \sqrt{40}$$

Yes, bc diags are \cong

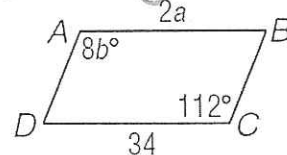
18. Find a and b in parallelogram ABCD.

$$2a = 34$$

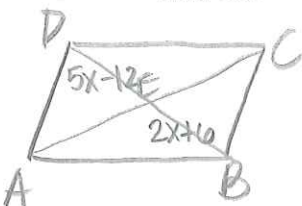
$$a = 17$$

$$8b = 112$$

$$b = 14$$



19. ABCD is a parallelogram with diagonals that intersect at E. If BE = 2x + 6 and ED = 5x - 12, find BD.



$$5x - 12 = 2x + 6$$

$$3x = 18$$

$$x = 6$$

$$5(6) - 12 + 2(6) + 6$$

$$36$$

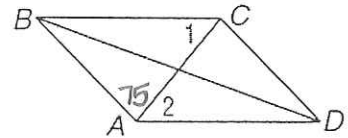
20. In parallelogram ABCD, $m\angle 1 = x + 25$, and $m\angle 2 = 2x$. Find $m\angle 2$ and $m\angle ABC$.

$$x + 25 = 2x$$

$$25 = x$$

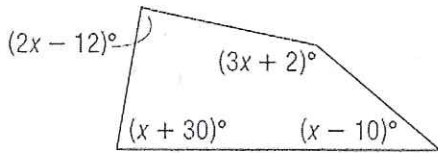
$$m\angle 2 = 50$$

$$m\angle ABC = 55$$



Find the measure of each interior angle.

21.

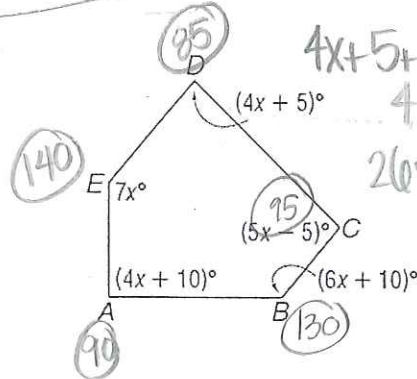


$$2x - 12 + 3x + 2 + x + 30 + x - 10 = 360$$

$$7x + 10 = 360$$

$$7x = 350 \quad x = 50$$

22.



$$4x + 5 + 5x - 5 + 6x + 10 + 4x + 10 + 7x = 540$$

$$26x + 20 = 540$$

$$26x = 520$$

$$x = 20$$

Answer the following questions by determining if each statement is *always*, *sometimes*, or *never* true.

23. A square is a parallelogram **Always**

24. A rhombus is a square **Sometimes**

25. A quadrilateral is a parallelogram **Sometimes**

26. A rectangle is a rhombus **Sometimes**

27. A quadrilateral that is a rectangle and a rhombus is a square. **Always**

Use rhombus $PRYZ$ with $RK = 4y + 1$, $ZK = 7y - 14$, $PK = 3x - 1$, and $YK = 2x + 6$.

28. Find PY .

$$3(7) - 1 + 2(7) + 6 = 40$$

29. Find RZ .

$$4(5) + 1 + 7(5) - 14 = 42$$

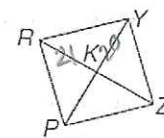
30. Find RY .

$$4^2 + 20^2 = RY^2$$

$$RY = 29$$

31. Find $m\angle YKZ$.

$$90$$



$$4y + 1 = 7y - 14$$

$$15 = 3y$$

$$5 = y$$

$$3x - 1 = 2x + 6$$

$$x = 7$$

COORDINATE GEOMETRY Given each set of vertices, determine whether $\square BEFG$ is a *rhombus*, a *rectangle*, or a *square*. List all that apply. Explain your reasoning.

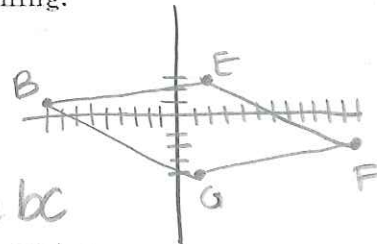
32. $B(-9, 1)$, $E(2, 3)$, $F(12, -2)$, $G(1, -4)$

$$BF = \sqrt{(12 - (-9))^2 + (-2 - 1)^2} = \sqrt{450}$$

$$EG = \sqrt{(1 - 2)^2 + (-4 - 3)^2} = \sqrt{50}$$

$$\text{Slope } BF = \frac{-2 - 1}{12 - (-9)} = \frac{-3}{21} = -\frac{1}{7}$$

$$\text{Slope } EG = \frac{-4 - 3}{1 - 2} = \frac{-7}{-1} = 7$$



Not a rectangle or square bc diags are not \cong . Rhombus bc diags are \perp bc slopes are opp recip

33. $B(1, 3)$, $E(7, -3)$, $F(1, -9)$, $G(-5, -3)$

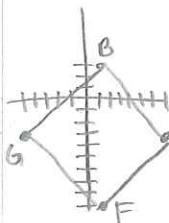
$$BF = \sqrt{(1 - 1)^2 + (-9 - 3)^2} = 12$$

$$GE = \sqrt{(7 - (-5))^2 + (-3 - (-3))^2} = 12$$

$$\text{Slope } BF = \frac{3 - (-9)}{1 - 1} = \text{undefined}$$

$$\text{Slope } EG = \frac{-3 - (-3)}{-5 - 7} = 0$$

rectangle bc diags are \cong
rhombus bc diags are \perp
square bc diags are \cong & \perp



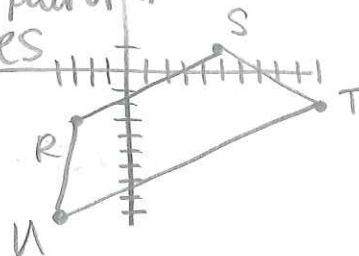
COORDINATE GEOMETRY $RSTU$ is a quadrilateral with vertices $R(-3, -3)$, $S(5, 1)$, $T(10, -2)$, $U(-4, -9)$.

34. Verify that $RSTU$ is a trapezoid.

$$\text{slope } RS = \frac{1-3}{5-3} = \frac{4}{2} = \frac{1}{2}$$

$$\text{slope } UT = \frac{-9-2}{-4-10} = \frac{-7}{-14} = \frac{1}{2}$$

Yes, one pair of // sides



35. Determine whether $RSTU$ is an isosceles trapezoid. Explain.

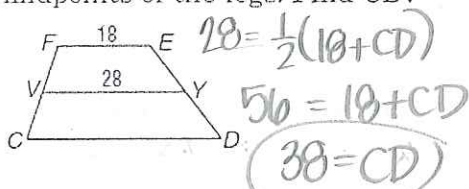
$$RU = \sqrt{(-4-3)^2 + (-9-3)^2} = \sqrt{1+36} = \sqrt{37}$$

$$ST = \sqrt{(5-10)^2 + (1-2)^2} = \sqrt{25+9} = \sqrt{34}$$

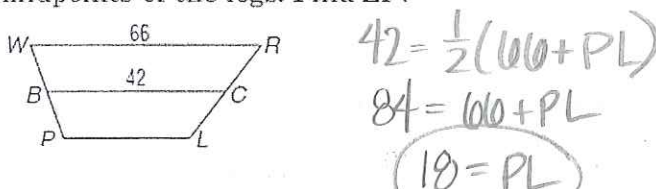
No, legs are not \cong

ALGEBRA Find the missing measure(s) for the given trapezoid.

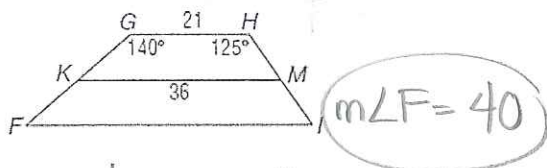
36. For trapezoid $CDEF$, V and Y are midpoints of the legs. Find CD .



37. For trapezoid $WRLP$, B and C are midpoints of the legs. Find LP .



38. For trapezoid $FGHI$, K and M are midpoints of the legs. Find FI , $m\angle F$, and $m\angle I$.



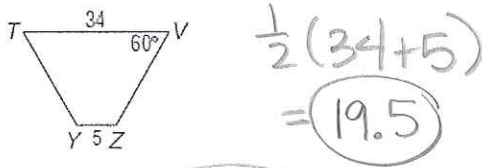
$$36 = \frac{1}{2}(21 + FI)$$

$$72 = 21 + FI$$

$$51 = FI$$

$$m\angle I = 55$$

39. For isosceles trapezoid $TVZY$, find the length of the median, $m\angle T$, and $m\angle Z$.



$$m\angle T = 60$$

$$m\angle Z = 120$$

40. Find x if the bases of a trapezoid have lengths $2x + 4$ and $8x - 10$ and the length of the median is $3x + 21$.

$$3x + 21 = \frac{1}{2}(2x + 4 + 8x - 10)$$

$$6x + 42 = 10x - 6$$

$$48 = 4x$$

$$12 = x$$