

Quadrilaterals - Parallelograms

Homework Practice Quiz 6.1 - 6.3

Name _____

For #1-4, Determine if each statement is true or false.

#1) A quadrilateral is a parallelogram if it has both pairs of opposite angles congruent. **True**

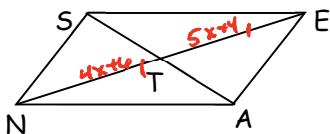
#2) A quadrilateral is a parallelogram if it has one pair of opposite sides congruent. **False**

#3) A quadrilateral is a parallelogram if it has one pair of opposite sides parallel and the other pair of opposite sides congruent. **False**

#4) A quadrilateral can have 5 sides. **False**

For #5-8, Use parallelogram NAES.

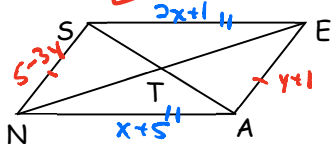
#5) If $NT = 4x + 6$, and $TE = 5x + 4$, find NE .



$$\begin{aligned} \textcircled{1} \quad NT &= TE \\ 4x+6 &= 5x+4 \\ 6 &= x+4 \\ 2 &= x \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad NE &= NT + TE \\ &= (4x+6) + (5x+4) \\ &= 9x+10 \\ &= 9(2)+10 \\ &= 18+10 \\ NE &= 28 \end{aligned}$$

#6) If $NS = 5 - 3y$, $SE = 2x + 1$, $EA = y + 1$, and $AN = x + 5$, find the values of x and y .

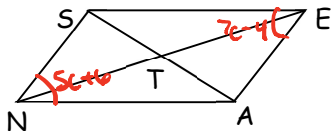


$$\begin{aligned} SE &= NA \\ 2x+1 &= x+5 \\ x+1 &= 5 \\ x &= 4 \end{aligned}$$

$$\begin{aligned} SN &= AE \\ 5-3y &= y+1 \\ 5 &= 4y+1 \\ 4 &= 4y \\ 1 &= y \end{aligned}$$

$$(4, 1)$$

#7) If $m\angle SNA = 5c + 6$ and $m\angle SEA = 7c - 4$, find $m\angle SNA$.

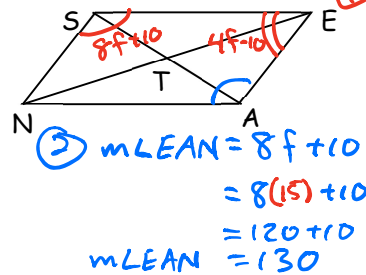


$$\begin{aligned} \textcircled{1} \quad m\angle SNA &= m\angle SEA \\ 5c+6 &= 7c-4 \\ 6 &= 2c-4 \\ 10 &= 2c \\ 5 &= c \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad m\angle SNA &= 5c+6 \\ &= 5(5)+6 \\ &= 25+6 \\ m\angle SNA &= 31 \end{aligned}$$

#8) If $m\angle NSE = 8f + 10$ and $m\angle SEA = 4f - 10$, then find

$m\angle EAN$.

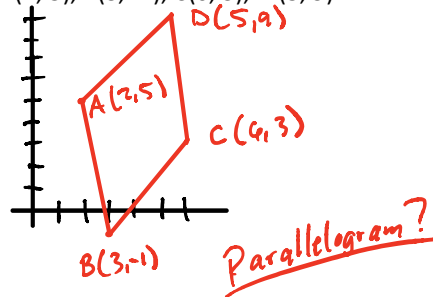


$$\begin{aligned} \textcircled{1} \quad m\angle NSE + m\angle SEA &= 180 \\ (8f+10) + (4f-10) &= 180 \\ 12f &= 180 \\ f &= 15 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad m\angle EAN &= 8f+10 \\ &= 8(15)+10 \\ &= 120+10 \\ m\angle EAN &= 130 \end{aligned}$$

Determine whether ABCD is a parallelogram given each set of vertices. EXPLAIN your answer.

#9) A(2, 5), B(3, -1), C(6, 3), D(5, 9)



$$M_{BD} = M_{AC}$$

$$\begin{aligned} M_{BD} &= \left(\frac{\sum x}{2}, \frac{\sum y}{2} \right) \\ &= \left(\frac{(3)+(5)}{2}, \frac{(-1)+(9)}{2} \right) \\ &= \left(\frac{8}{2}, \frac{8}{2} \right) \\ M_{BD} &= (4, 4) \end{aligned}$$

$$\begin{aligned} M_{AC} &= \left(\frac{\sum x}{2}, \frac{\sum y}{2} \right) \\ &= \left(\frac{(2)+(6)}{2}, \frac{(5)+(3)}{2} \right) \\ &= \left(\frac{8}{2}, \frac{8}{2} \right) \\ M_{AC} &= (4, 4) \end{aligned}$$

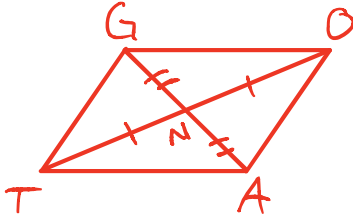
Yes, the diagonals bisect each other.

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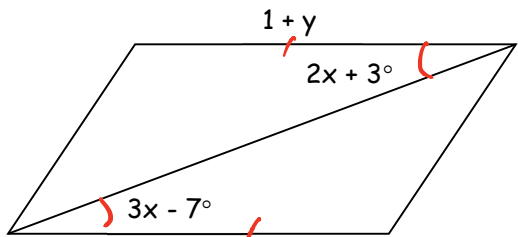
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#10) In quadrilateral GOAT, segment GA bisects segment OT at N, and segment GN is congruent to segment NA. Must GOAT be a parallelogram? Circle Yes or NO.



What values must x and y have in order for each quadrilateral to be a parallelogram?



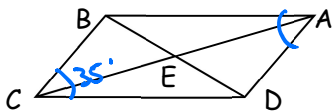
$$\begin{aligned} 1-y &= 1+y \\ 1 &= 1+2y \\ 0 &= 2y \\ 0 &= y \end{aligned}$$

$$\begin{aligned} 3x-7 &= 2x+3 \\ x-7 &= 3 \\ x &= 10 \end{aligned}$$

$(10, 0)$

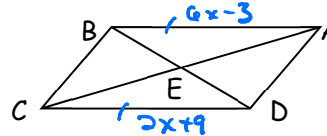
The figure BADC is a parallelogram. Use this figure and the information given to solve each problem.

#12) If $m\angle BCD = 35$, find $m\angle BAD$.



$m\angle BAD = 35^\circ$

#13) If $AB = 6x - 3$ and $CD = 2x + 9$, find AB.



$$\begin{aligned} \textcircled{1} \quad AB &= CD \\ 6x-3 &= 2x+9 \\ 4x-3 &= 9 \\ 4x &= 12 \\ x &= 3 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad AB &= 6x-3 \\ &= 6(3)-3 \\ &= 18-3 \\ AB &= 15 \end{aligned}$$

Find the ordered pair that satisfies the system of equations.

#14)

$$\begin{cases} 3x - y = 2 \\ x + 2y = 3 \end{cases} \rightarrow \begin{aligned} x &= -2y + 3 \\ x &= -2(1) + 3 \\ x &= -2 + 3 \\ x &= 1 \end{aligned}$$

$$\begin{aligned} 3(-2y+3) - y &= 2 \\ -6y + 9 - y &= 2 \\ -7y + 9 &= 2 \\ -7y &= -7 \\ y &= 1 \end{aligned}$$

$(1, 1)$

#15)

$$\begin{cases} 2x + 3y = 6 \\ x + 2y = 5 \end{cases} \rightarrow \begin{aligned} x &= 5 - 2y \\ x &= 5 - 2(4) \\ x &= 5 - 8 \\ x &= -3 \end{aligned}$$

$$\begin{aligned} 2(5-2y) + 3y &= 6 \\ 10 - 4y + 3y &= 6 \\ 10 - y &= 6 \\ -y &= -4 \\ y &= 4 \end{aligned}$$

$(-3, 4)$

- | | | |
|--|-------------------------|------------|
| #1) True | #2) False | #3) False |
| #4) False | #5) NE = 28 | #6) (4, 1) |
| #7) $m\angle SNA = 31$ | #8) $m\angle EAN = 130$ | |
| #9) Yes, because the diagonals bisect each other. (answers vary) | | |
| #10) Yes | | |
| #11) (10, 0) | #12) 35 | #13) 15 |
| #14) (1, 1) | #15) (-3, 4) | |