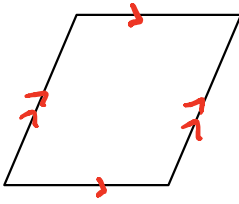


# Quadrilaterals – Parallelograms

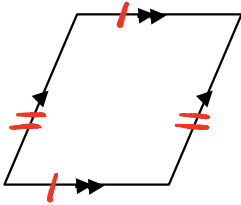
Notes Section 6.2

Name \_\_\_\_\_

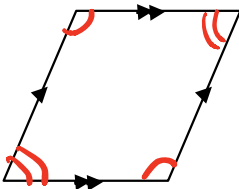
Parallelogram: a quadrilateral with both pairs of opposite sides parallel.



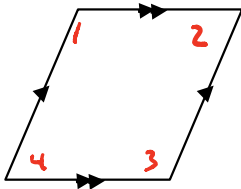
Theorem 6-1: Opposite sides of a parallelogram are congruent.



Theorem 6-2: Opposite angles of a parallelogram are congruent.

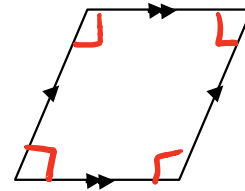


Theorem 6-3: Consecutive angles in a parallelogram are supplementary.

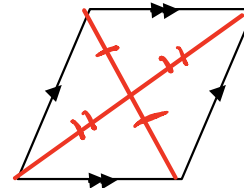


*L1 and L2 are supplementary  
L3 and L4 are supplementary*

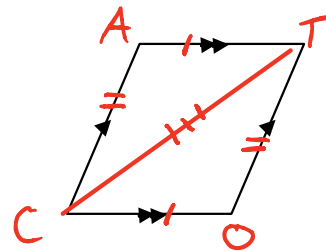
Theorem 6-4: If a parallelogram has one right angle then it has four right angles.



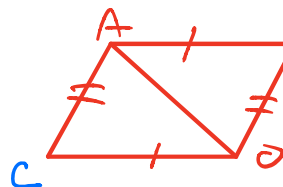
Theorem 6-5: The diagonals of a parallelogram bisect each other.



Theorem 6-6: Each diagonal of a parallelogram separates the parallelogram into two congruent triangles.



$\triangle CAT \cong \triangle TOA$



$\triangle ATO \cong \triangle OCA$

# Quadrilaterals – Parallelograms

Notes Section 6.2

Name \_\_\_\_\_

Is each quadrilateral a parallelogram? Justify your answer.

#1)

Yes, Converse to consecutive angles theorem makes  $l \parallel m$ . By def'n, this is a parallelogram.

#2)

Yes, Converse to corresponding angles postulate makes  $l \parallel m$  and  $p \parallel q$ . By def'n, this is a parallelogram.

If each quadrilateral is a parallelogram, find the value of x, y, and z.

#3)

$x + 80 = 180$   
 $x = 100$

$y = 80$ ,  $z = 80$

#4)

$x = 70$   
 $z = 15$

$n + 70 = 180$   
 $n = 110$

$y + 15 = 110$   
 $y = 95$

With the given information, answer each question.

#5) Given parallelogram PQRS with  $m\angle P = 2y$  and  $m\angle Q = 4y + 30$ , find the  $m\angle R$  and  $m\angle S$ .

①  $2y + 4y + 30 = 180$   
 $6y + 30 = 180$   
 $6y = 150$   
 $y = 25$

②  $m\angle R = 2y = 2(25) = 50$

③  $m\angle S = 4y + 30 = 4(25) + 30 = 100 + 30 = 130$

#6) If NCTM is a parallelogram,  $m\angle N = 12x + 10y + 5$ ,  $m\angle C = 9x$ , and  $m\angle T = 6x + 15y$ , find  $m\angle M$ .

①  $9x + 6x + 15y = 180$   
 $15x + 15y = 180$   
 $x + y = 12$

②  $9x + 12x + 10y + 5 = 180$   
 $21x + 10y + 5 = 180$   
 $21x + 10y = 175$

③  $y = 12 - x$

④  $21x + 10y = 175$

⑤  $21x + 10(12 - x) = 175$   
 $21x + 120 - 10x = 175$   
 $11x + 120 = 175$   
 $11x = 55$   
 $x = 5$

⑥  $y = 12 - x = 12 - 5 = 7$

(5, 7)