

## Sec 6-2: Properties of Parallelograms:

Use a sheet of graph paper to plot Parallelogram ABCD:

A(5, 6) B(1, -2) C(-7, -2) D(-3, 6)

Find the slope of all four sides.

$$AB \ m = \frac{2}{1}$$

$$BC \ m = 0$$

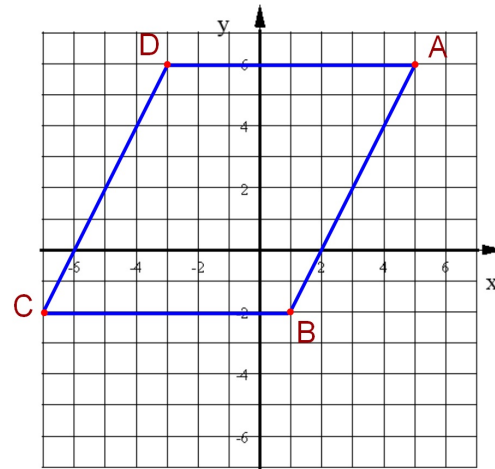
$$\overline{AB} \parallel \overline{CD}$$

$$CD \ m = \frac{0}{2}$$

$$DA \ m = \frac{0}{-2} = 0$$

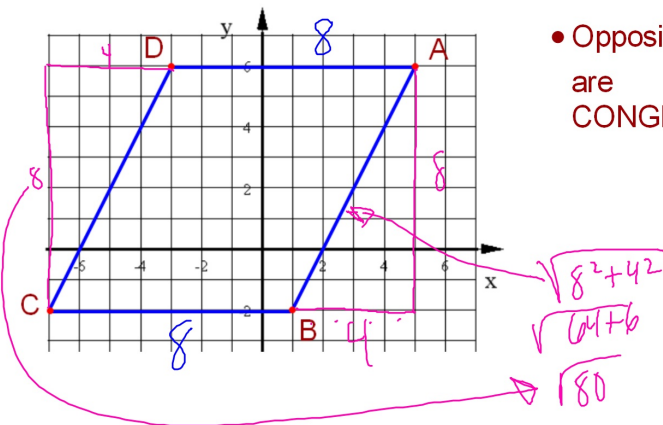
$$\overline{BC} \parallel \overline{DA}$$

A(5, 6) B(1, -2) C(-7, -2) D(-3, 6)



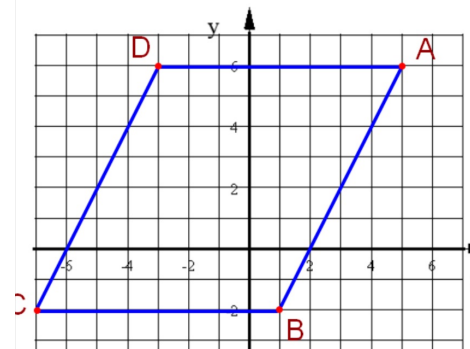
- Opposite sides are PARALLEL

Find the length of all four sides.



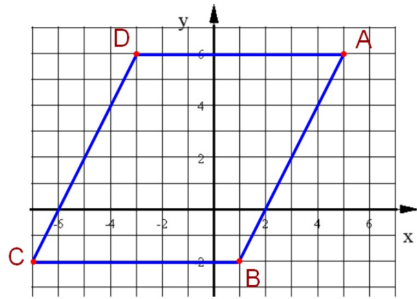
- Opposite sides are CONGRUENT

What is true about the angles of a Parallelogram?



- Consecutive angles are SUPPLEMENTARY

$\angle D$  is supplementary to  $\angle A$  and  
 $\angle B$  is supplementary to  $\angle A$ , therefore,  
 $\angle D \cong \angle B$



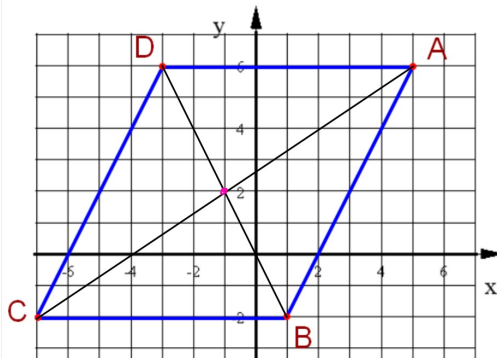
- Opposite angles are CONGRUENT

Draw the two diagonals of Parallelogram ABCD.

What is the midpoint of  $\overline{AC}$ ?  
 (-1, 2)

What is the midpoint of  $\overline{BD}$ ?  
 (-1, 2)

If two segments have the same midpoint, then they bisect each other.



- Diagonals of a Parallelogram bisect each other.

Properties of a Parallelogram:

- Opposite sides are PARALLEL *Slope*
- Opposite sides are CONGRUENT *DISTANCE*
- Consecutive angles are SUPPLEMENTARY
- Opposite angles are CONGRUENT
- Diagonals of a Parallelogram bisect each other (they have the same midpoint)

Is PQRS a parallelogram?

P(5, 7) Q(9, -3) R(1, -1) S(-3, 4)

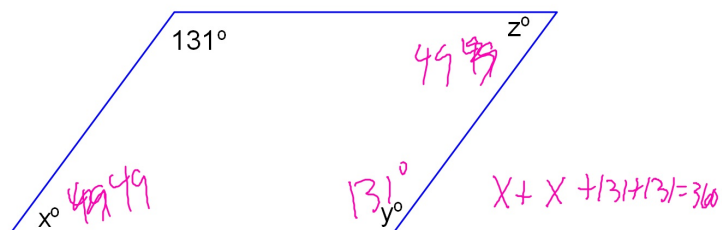
DIAG  $\overline{PR}$  MIDPOINT (3, 3)  
 DIAG  $\overline{QS}$  (3,  $\frac{1}{2}$ ) NO, DIAG DON'T BISECT

Is EFGH a parallelogram?

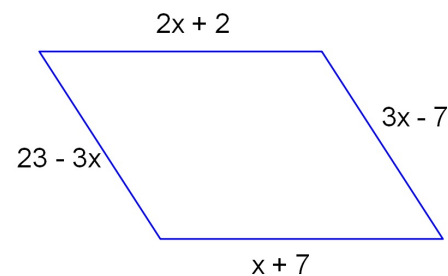
E(2, 11) F(1, -4) G(6, -5) H(7, 10)

MIDPOINT  
 EG (4, 3)  
 FH (4, 3) Yes, diag bisect

Find the value of each variable in this parallelogram.



Find the value of x in this parallelogram then find the lengths of the sides.



side lengths: 12, 12, 8, 8

$$2x + 2 = x + 7$$

$$x = 5$$

$$23 - 3x = 3x - 7$$

$$x = 5$$

Find the value of  $a$  in each parallelogram.

1.



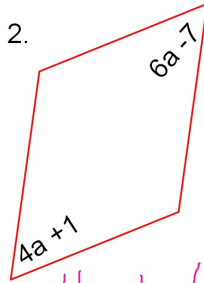
$$2a + 7 + 3a + 8 = 180$$

$$5a + 15 = 180$$

$$5a = 165$$

$$a = 33$$

2.



$$4a + 1 = 6a - 7$$

$$8 = 2a$$

$$a = 4$$

Hwk #16:

Sec 6-2

Pages 315 - 316

Problems 5-7, 10, 12, 33.