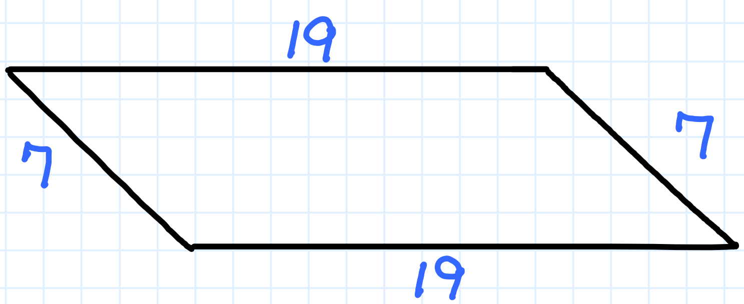
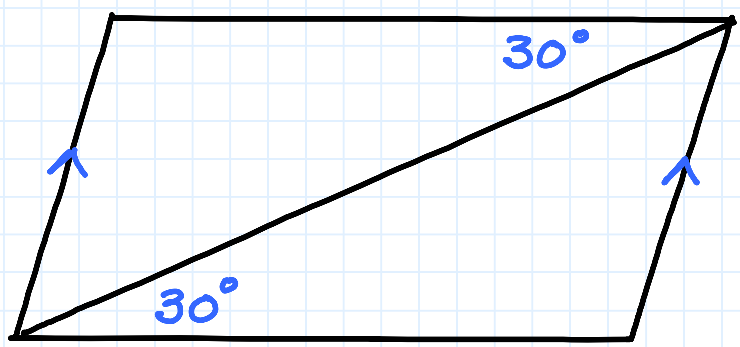
Proving Quadrilaterals Are Parallelograms

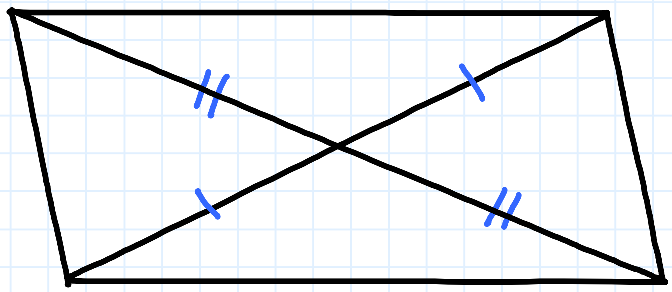
Overview of problems

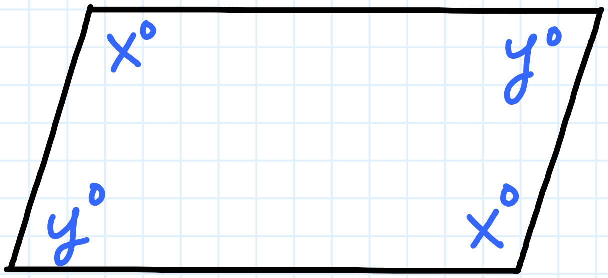
Example Set: A

Determine if each quadrilateral is a parallelogram; if you think the quadrilaterial is in fact a parallelogram justify your conclusion.





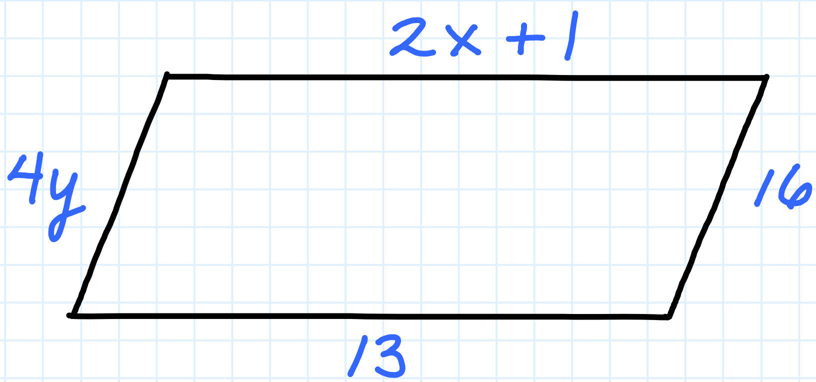


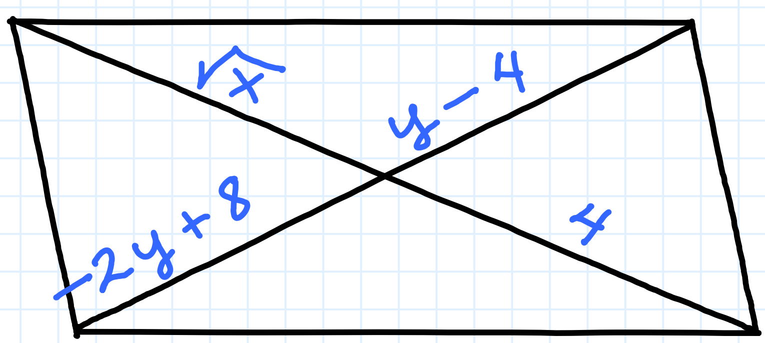


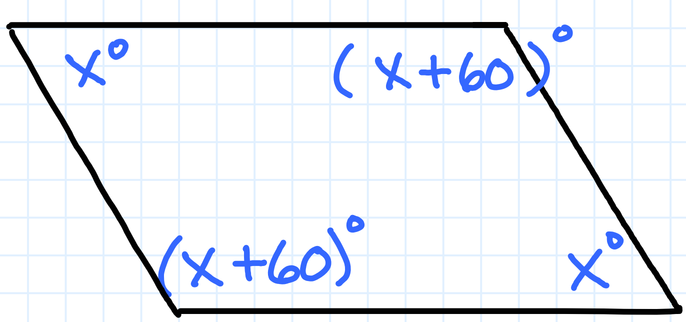
x°
y°
y°
x°

Example Set: B

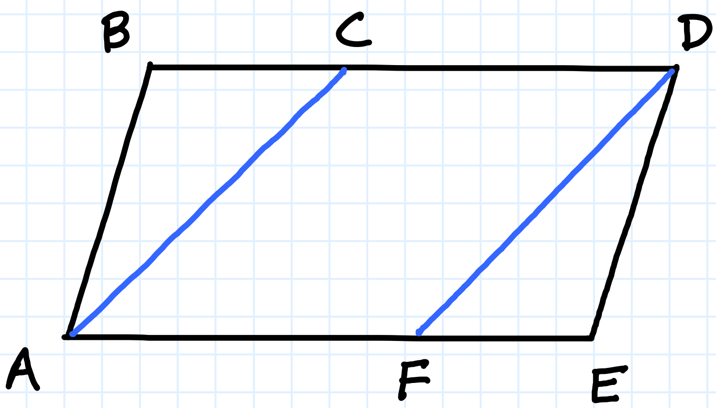
Determine the values of the variables so that the quadrilateral is a parallelogram.







Example Set: C



Given: ▱ABDE,
AC bisects ∠A
DF bisects ∠D
∠ACD ≅ ∠AFD

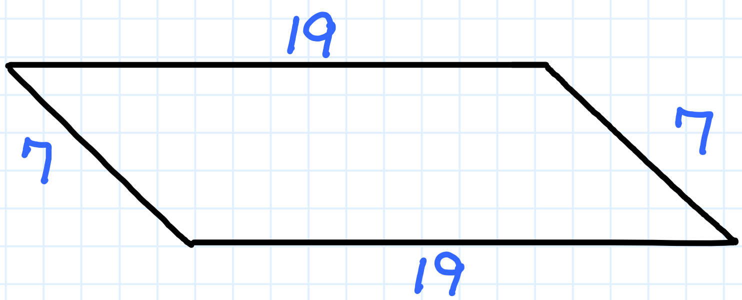
Prove: ACDF is ▱

Proving Quadrilaterals Are Parallelograms

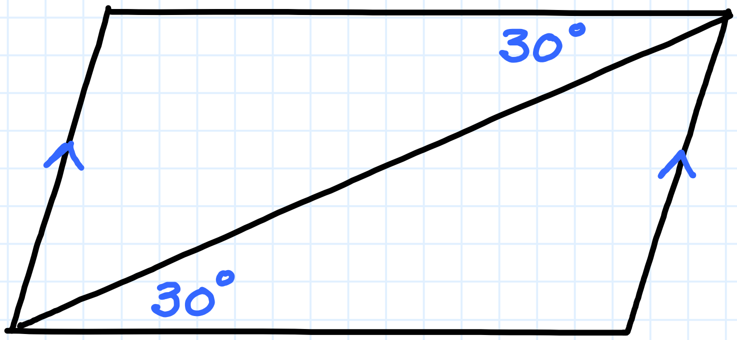
Overview of problems- KEY

Example Set: A

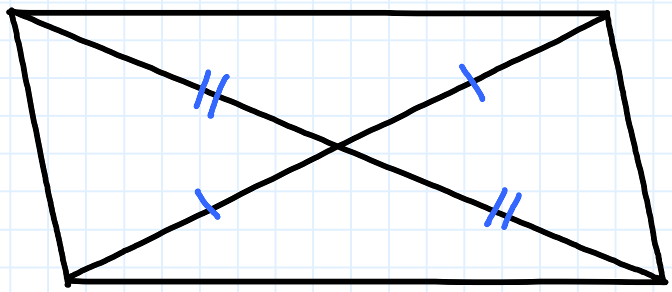
Determine if each quadrilateral is a parallelogram; if you think the quadrilaterial is in fact a parallelogram justify your conclusion.



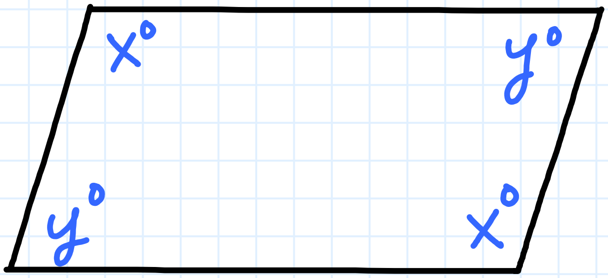
yes, opposite sides are $\cong$



yes, opposite sides are $\parallel$



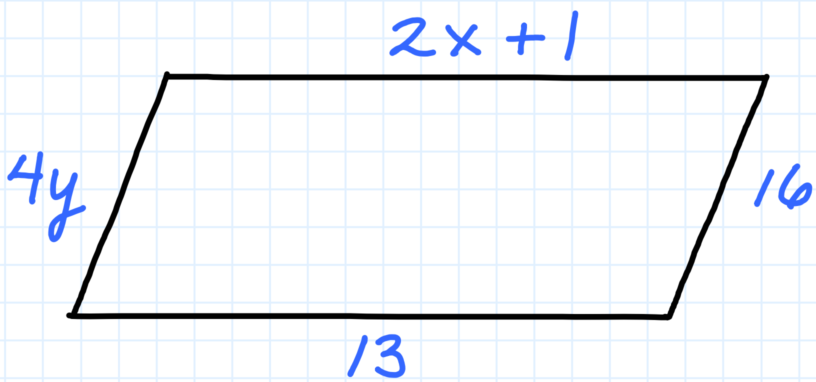
yes, diagonals bisector each other



yes, opposite angles are congruent

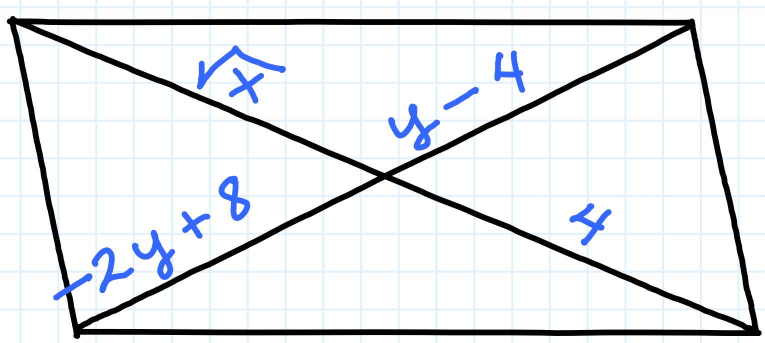
Example Set: B

Determine the values of the variables so that the quadrilateral is a parallelogram.



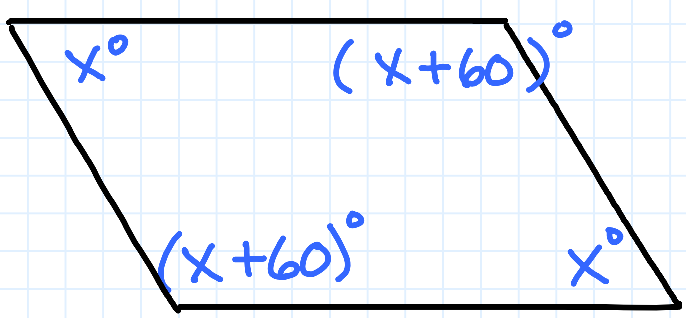
$x = 6$

$y = 4$



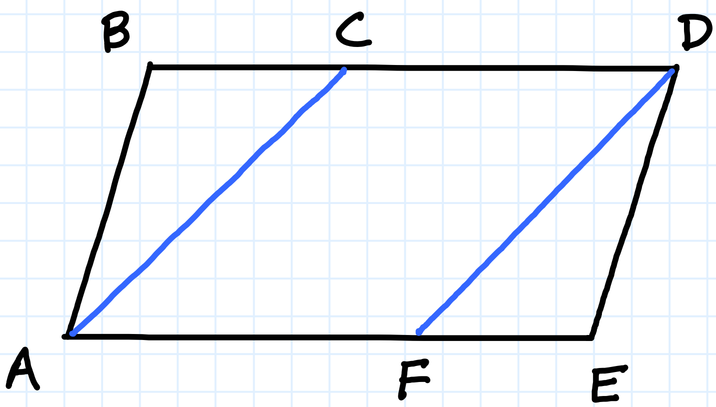
$x = 16$

$y = 4$



$x = 60°$

Example Set: C



Given: ▱ ABDE,
AC bisects $\angle A$
DF bisects $\angle D$
$\angle ACD \cong \angle AFD$

Prove: ACDF is ▱

statement	reason
$\angle A \cong \angle D$	opp. $\angle$'s of ▱ are $\cong$
$\angle BAC \cong \angle CAF$ $\angle CDF \cong \angle FDE$	$\angle$'s formed by angle bisector are $\cong$
$\angle A = \angle BAC + \angle CAF$ $\angle D = \angle CDF + \angle FDE$	Def. of angle bisector
$\angle BAC + \angle CAF =$ $\angle CDF + \angle FDE$	Sub. Prop.
$\angle CAF + \angle CAF =$ $\angle CDF + \angle CDF$	Sub. Prop.

statement	reason
$2\angle CAF = 2\angle CDF$	Add. Prop.
$\angle CAF \cong \angle CDF$	Division Prop.
$\angle ACD \cong \angle AFD$	Given
ACDF is a ▱	A quad with both pairs of opp. angles that are $\cong$ is a ▱.