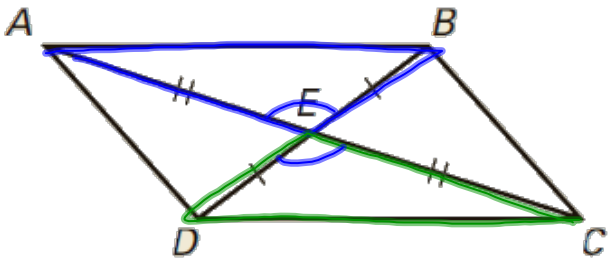
Warm Up

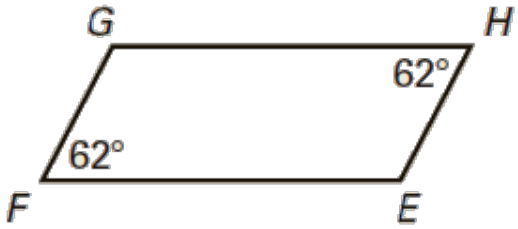
1. What congruence postulate shows that $\Delta ABE \cong \Delta CDE$

SAS



2. If $\angle E \cong \angle G$ find $m\angle E$.

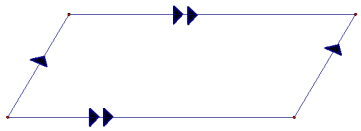
$m\angle E = 118$



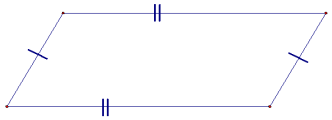
8.3 Proving a quadrilateral is a parallelogram

Ways to Prove a Quadrilateral is a Parallelogram

1. Show both pairs of opposite sides are parallel

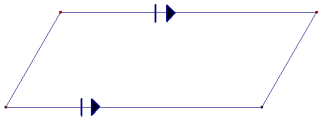


2. Show both pairs of opposite sides are congruent

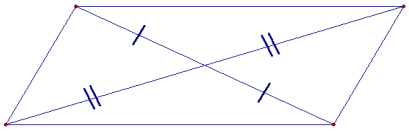


3. Show both pairs of opposite angles are congruent

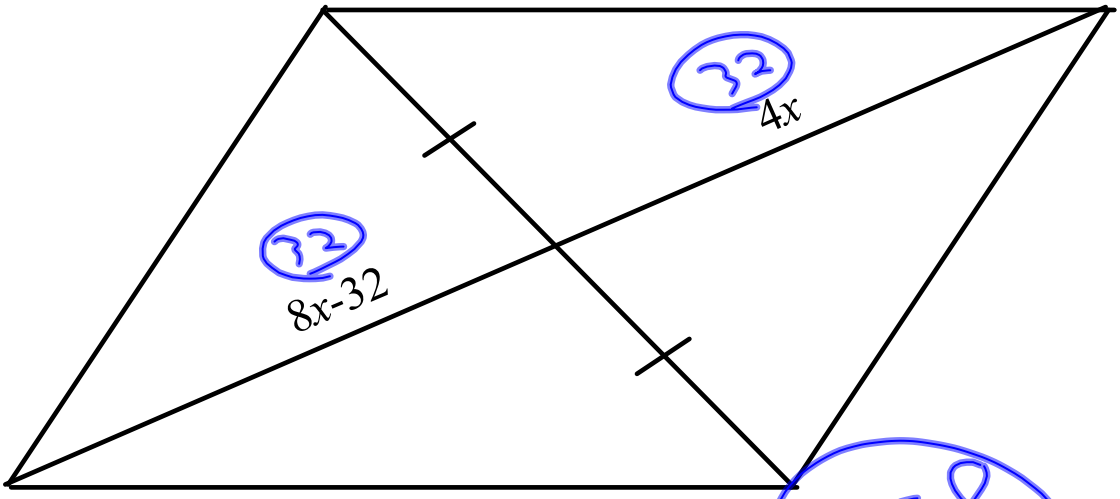
4. Show one pair of opposite sides are congruent and parallel



5. Show the diagonals bisect each other



Ex 1 For what value of *x* is the quadrilateral a parallelogram?



$8x-32=4x$

$8x=4x+32$

$4x=32$

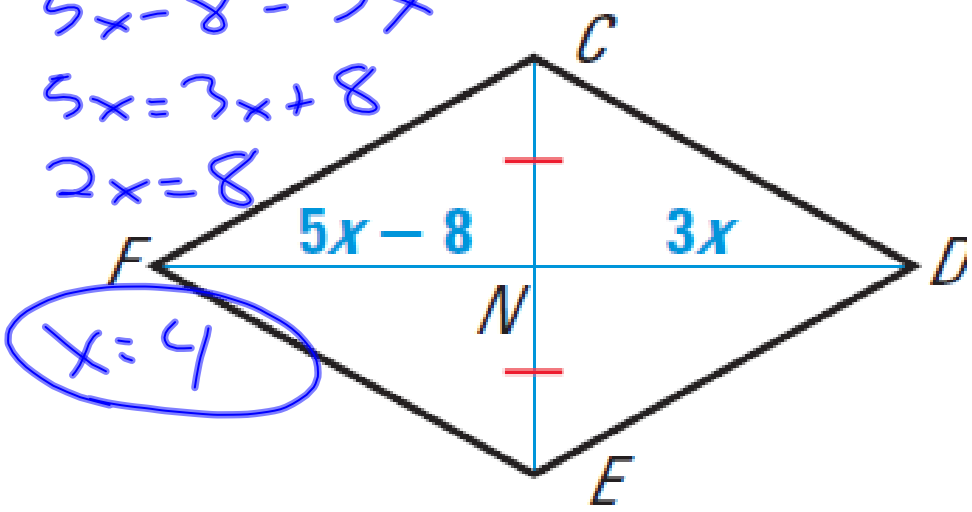
$x=8$

Ex. 2 For what value of x is quadrilateral $CDEF$ a parallelogram?

$5x-8=3x$

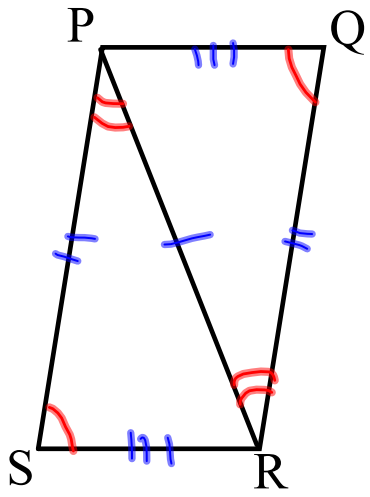
$5x=3x+8$

$2x=8$



$x=4$

Ex 3 Describe how to prove that $PQRS$ is a parallelogram

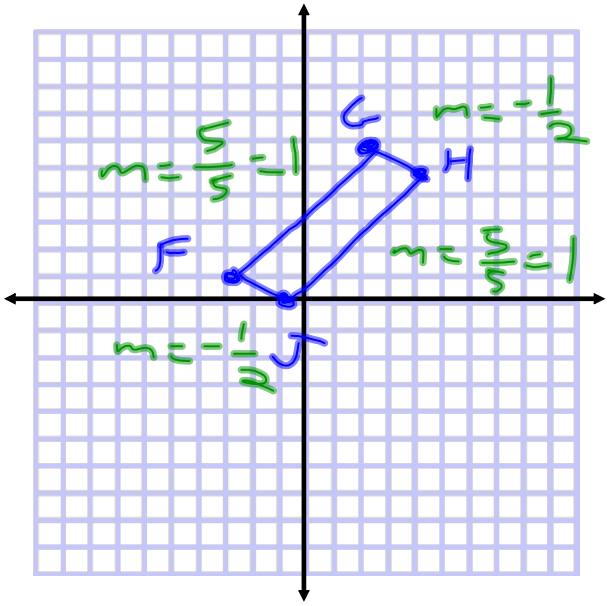


$\triangle SPR \cong \triangle QRP$ by AAS

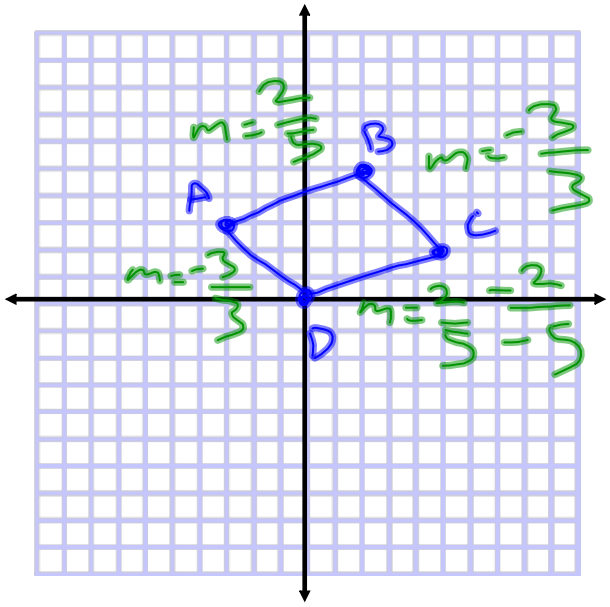
$\overline{PQ} \cong \overline{SR}$
$\overline{PS} \cong \overline{QR}$ by CPCTC

$\therefore$ This is a parallelogram

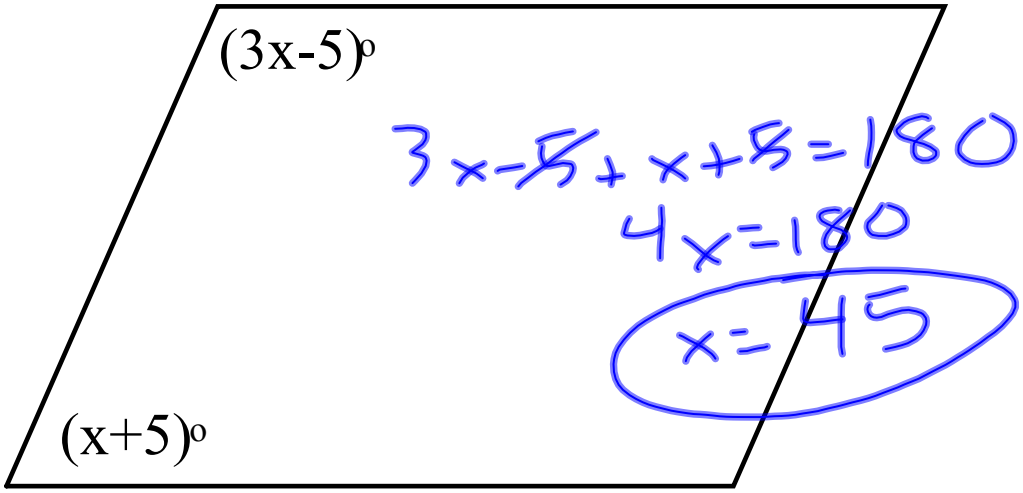
Ex 4 Given $F(-3, 1)$, $G(2, 6)$, $H(4, 5)$, $J(-1, 0)$
Show that $FGHJ$ is a parallelogram.



Ex 5 Given $A(-3, 3)$, $B(2, 5)$, $C(5, 2)$, $D(0, 0)$
Show that $ABCD$ is a parallelogram.



Ex 6 For what value of x is the quadrilateral a parallelogram?



$3x-5+x+5=180$

$4x=180$

$x=45$

Ex. 7 Three of the vertices of a parallelogram are given. Find the coordinates of the missing vertex. ABCD

(-2, -3) (4, -3) (3, 2) A B C D

(-3, 2)

(9, 2)

(-1, -8)