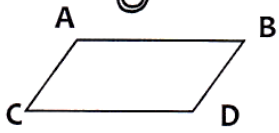
Master Ex

6-2 & 6-3 Parallelograms & Tests for Parallelograms

To name a parallelogram, use the symbol $\square$. The parallelogram shown is $\square ABDC$.

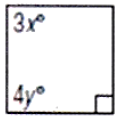


Fill in the blanks based on your findings from the AngLegs Activity:

- If a quadrilateral is a parallelogram, then its opposite sides are parallel (definition).
- If a quadrilateral is a parallelogram, then its opposite sides are congruent.
- If a quadrilateral is a parallelogram, then its opposite angles are congruent.
- If a quadrilateral is a parallelogram, then its consecutive angles are supplementary
- If a quadrilateral is a parallelogram, then its diagonals bisect each other.

1-12: Find x and y in each parallelogram.

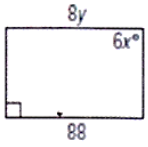
1.



$3X=90$, $X=30$

$4y=90$, $y=22.5$

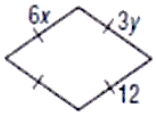
2.



$6X=90$, $X=15$

$8y=88$, $y=11$

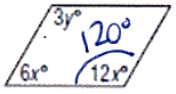
3.



$6X=12$, $X=2$

$3y=12$, $y=4$

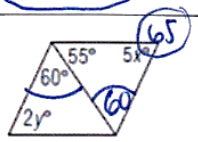
4.



$6X+12X=180$, $18X=180$, $X=10$

$3y=120$, $y=40$

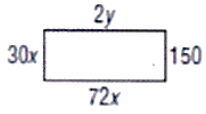
5.



$5X+55+60=180$, $5X+115=180$, $5X=65$, $X=13$

$2y=65$, $y=32.5$

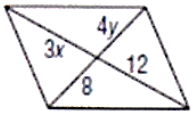
6.



$30X=150$, $X=5$

$2y=72X$, $2y=360$, $y=180$

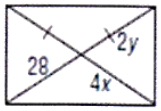
7.



$3X=12$, $X=4$

$4y=8$, $y=2$

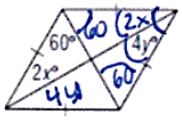
8.



$4X=28$, $X=7$

$2y=28$, $y=14$

9.

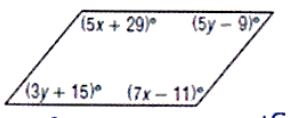


Since $2X=4y$, the 60° angle is bisected which is why

$2X=30$, $X=15$

$4y=30$, $y=7.5$

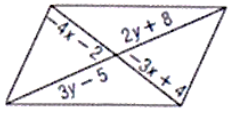
10.



$5X+29=7X-11$, $40=2X$, $X=20$

$3y+15=5y-9$, $24=2y$, $y=12$

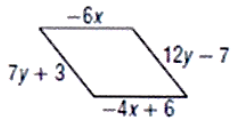
11.



$-4X-2=-3X+4$, $-X-2=4$, $-X=6$, $X=-6$

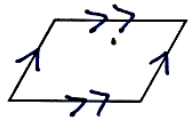
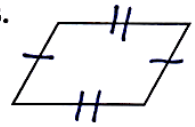
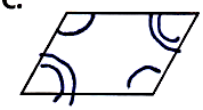
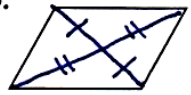
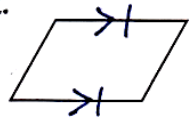
$3y-5=2y+8$, $y=13$

12.



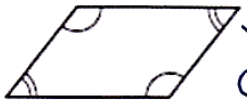
$-6X=-4X+6$, $-2X=6$, $X=-3$

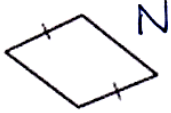
$7y+3=12y-7$, $10=5y$, $y=2$

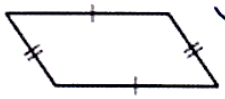
Diagram	Exact Conditions to prove a Quadrilateral is a Parallelogram
A. 	If both pairs of opposite sides of a quadrilateral are parallel, then it is a parallelogram. This is the def. ☐
B. 	If both pairs of opposite sides of a quadrilateral are congruent, then it is a parallelogram.
C. 	If a both pairs of opposite angles of a quadrilateral are congruent, then it is a parallelogram.
D. 	If the diagonals of a quadrilateral bisect each other, then it is a parallelogram.
E. 	If one pair of opposite sides of a quadrilateral is both parallel and congruent, then it is a parallelogram.

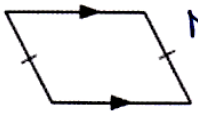
1-8: Determine if each quadrilateral is a parallelogram. Justify your answer with one of the reasons above.

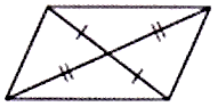
1.  Yes E

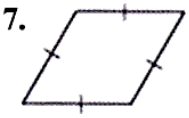
2.  Yes C

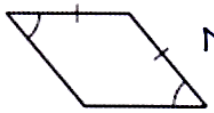
3.  NO

4.  Yes B

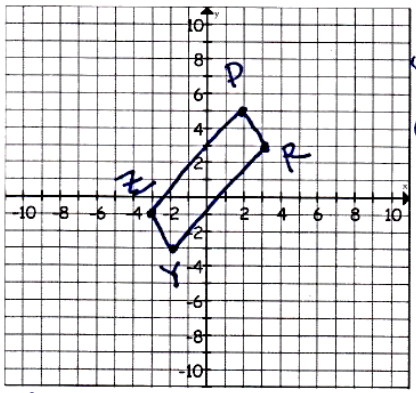
5.  NO

6.  Yes D

7.  Yes B

8.  No

9. Graph P(2, 5), R(3, 3), Y(-2, -3), and Z(-3, -1) below. Show that the quadrilateral is a parallelogram by proving both pairs of opposite sides are parallel.



Slope $PZ = \frac{6}{5}$

Slope $YR = \frac{6}{5}$

Slope $ZY = -2$

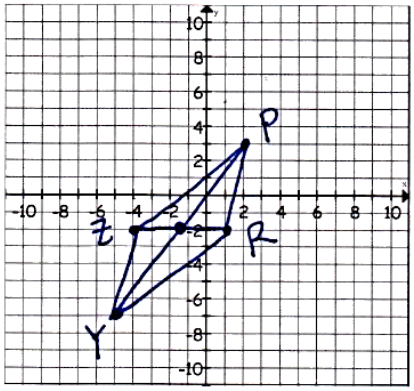
Slope $PR = -2$

$\overline{PZ} \parallel \overline{YR}$

$\overline{ZY} \parallel \overline{PR}$

Opposite sides are parallel because they have the same slope.

10. Graph P(2, 3), R(1, -2), Y(-5, -7), and Z(-4, -2) below. Show that the quadrilateral is a parallelogram by proving the diagonals bisect each other.



Midpt. of $\overline{PY}$

$\left(\frac{2+-5}{2}, \frac{3+-7}{2}\right)$

$\left(-\frac{3}{2}, \frac{-4}{2}\right)$

$\left(-\frac{3}{2}, -2\right)$

Midpt. of $\overline{ZR}$

$\left(\frac{1+-4}{2}, \frac{-2+-2}{2}\right)$

$\left(-\frac{3}{2}, \frac{-4}{2}\right)$

$\left(-\frac{3}{2}, -2\right)$

They share the same midpoint, which means the diagonals bisect each other.