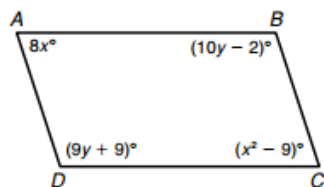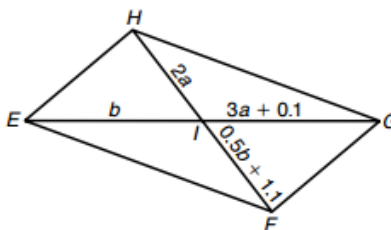**For Exercises 1 and 2, determine whether the figure is a parallelogram for the given values of the variables. Explain your answers.**

1. $x = 9$ and $y = 11$
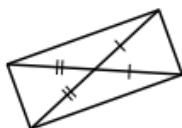
A ——— B

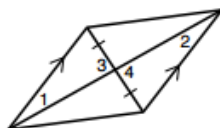$8x°$ $(10y - 2)°$

$(9y + 9)°$ $(x^2 - 9)°$

D ——— C

2. $a = 4.3$ and $b = 13$

H

$2a$

E b $3a + 0.1$ G

$0.5b + 1.1$

F

_____   _____

_____   _____

_____   _____

Determine whether each quadrilateral must be a parallelogram. Justify your answers.

3.

4.

5. $x°$ $(180 - x)°$

$x°$

_____   _____   _____

_____   _____   _____
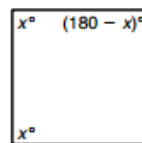
_____   _____   _____

_____   _____   _____

Use the given method to determine whether the quadrilateral with the given vertices is a parallelogram.

6. Find the slopes of all four sides: $J(-4, -1)$, $K(-7, -4)$, $L(2, -10)$, $M(5, -7)$

_____

_____

**7.** Find the lengths of all four sides: $P(2, 2)$, $Q(1, -3)$, $R(-4, 2)$, $S(-3, 7)$

_____

8. Find the slopes and lengths of one pair of opposite sides:

$T\left(\frac{3}{2}, -2\right)$, $U\left(\frac{3}{2}, 4\right)$, $V\left(-\frac{1}{2}, 0\right)$, $W\left(-\frac{1}{2}, -6\right)$

_____

Practice B
### *Conditions for Special Parallelograms*

1. On the National Mall in Washington, D.C., a reflecting pool lies between the Lincoln Memorial and the World War II Memorial. The pool has two 2300-foot-long sides and two 150-foot-long sides. Tell what additional information you need to know in order to determine whether the reflecting pool is a rectangle. (*Hint:* Remember that you have to show it is a parallelogram first.)

_____

_____

_____

_____

Use the figure for Exercises 2–5. Determine whether each conclusion is valid. If not, tell what additional information is needed to make it valid.
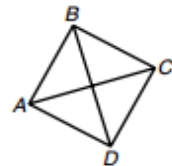
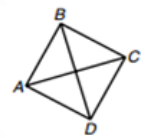2. **Given:** $\overline{AC}$ and $\overline{BD}$ bisect each other. $\overline{AC} \cong \overline{BD}$
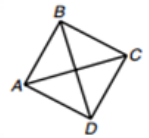   **Conclusion:** *ABCD* is a square.

_____

3. **Given:** $\overline{AC} \perp \overline{BD}$, $\overline{AB} \cong \overline{BC}$
   Conclusion: *ABCD* is a rhombus.

_____
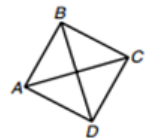
4. **Given:** $\overline{AB} \cong \overline{DC}$, $\overline{AD} \cong \overline{BC}$, $m\angle ADB = m\angle ABD = 45°$
   Conclusion: *ABCD* is a square.

_____

5. **Given:** $\overline{AB} \parallel \overline{DC}$, $\overline{AD} \cong \overline{BC}$, $\overline{AC} \cong \overline{BD}$
   Conclusion: *ABCD* is a rectangle.

_____

Find the lengths and slopes of the diagonals to determine whether a parallelogram with the given vertices is a rectangle, rhombus, or square. Give all names that apply.

6. $E(-2, -4)$, $F(0, -1)$, $G(-3, 1)$, $H(-5, -2)$ _____

   $EG =$ _____ $FH =$ _____

   slope of $\overline{EG} =$ _____   slope of $\overline{FH} =$ _____

7. $P(-1, 3)$, $Q(-2, 5)$, $R(0, 4)$, $S(1, 2)$ _____

   $PR =$ _____ $QS =$ _____

   slope of $\overline{PR} =$ _____   slope of $\overline{QS} =$ _____