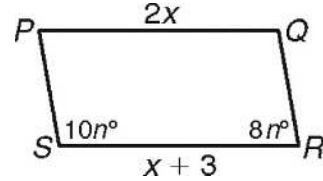Name _____ Date _____ Class _____

Properties of Parallelograms

Practice and Problem Solving: A/B
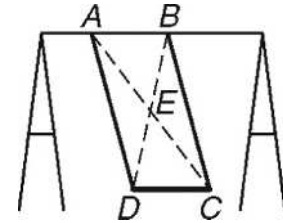
***PQRS* is a parallelogram. Find each measure.**

1. *RS* _____

2. m∠*S* _____

3. m∠*R* _____

(figure: parallelogram PQRS with top side 2x, P top-left, Q top-right, angle 10n° at S, angle 8n° at R, bottom side x + 3, S bottom-left, R bottom-right)

The figure shows a swing blown to one side by a breeze. As long as the seat of the swing is parallel to the top bar, the swing makes a parallelogram. In

□ *ABCD, DC* = 2 ft, *BE* = $4\frac{1}{2}$ ft, and m∠*BAD* = 75°.

Find each measure.
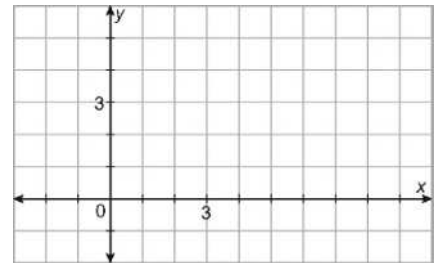
4. *AB* _____

5. *ED* _____

6. *BD* _____

7. m∠*ABC* _____

8. m∠*BCD* _____

9. m∠*ADC* _____

Three vertices of □ *GHIJ* are *G*(0, 0), *H*(2, 3), and *J*(6, 1). Use the grid to the right to complete Problems 10–16.

10. Plot vertices *G*, *H*, and *J* on the coordinate plane.

11. Find the rise (difference in the *y*-coordinates) from

    G to *H*. _____

12. Find the run (difference in the *x*-coordinates) from

    G to *H*. _____

13. Using your answers from Problems 11 and 12, add the rise to the
    y-coordinate of vertex *J* and add the run to the *x*-coordinate of vertex *J*.
    These are the coordinates of vertex *I*. (_____, _____)

14. Plot vertex *I*. Connect the points to draw □ *GHIJ*.

15. Check your answer by finding the slopes of $\overline{IH}$ and $\overline{JG}$.

    slope of $\overline{IH}$ = _____   slope of $\overline{JG}$ = _____

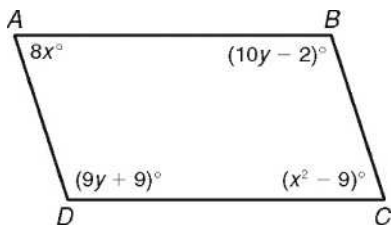16. What do the slopes tell you about $\overline{IH}$ and $\overline{JG}$? _____

    _____

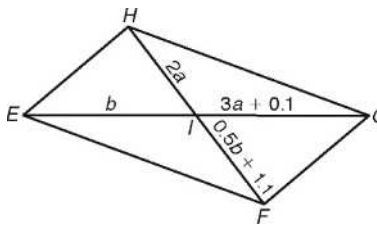| LESSON 9-2	# Conditions for Parallelograms

Practice and Problem Solving: A/B

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

I

$0.5b + 1.1$

F

_____

_____

_____

A quadrilateral has vertices $E(1, 1)$, $F(4, 5)$, $G(6, 6)$, and $H(3, 2)$. Complete Problems 3–6 to tell whether $EFGH$ is a parallelogram.

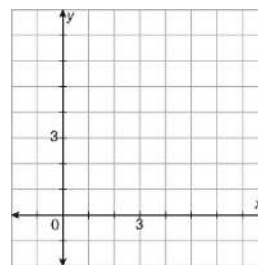3. Plot the vertices and draw *EFGH.*

4. Use the Pythagorean theorem to find the lengths of

   sides $\overline{EF}$ and $\overline{HG}$. $EF =$ _____ $HG =$ _____

5. Use the Slope Formula to find the slopes of sides $\overline{EF}$ and

   $\overline{GH}$. slope of $\overline{EF} =$ _____ slope of $\overline{HG} =$ _____

6. The answers to Problems 4 and 5 reveal something about figure *EFGH*. State the theorem that uses these facts to prove that *EFGH* is a parallelogram.

   _____

   _____

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

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

   _____

   _____

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

   _____

   _____