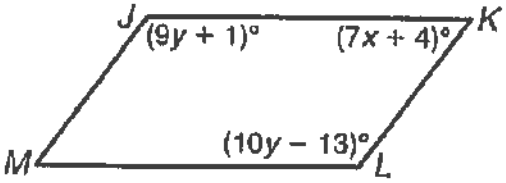
Geometry H
Quadrilaterals Unit Review

Name _____
Period _____ Date _____

I. G-CO.11 Learning Target: *I can prove theorems about parallelograms.*

1. Prove that *JKLM* is a parallelogram for $x=7$ and $y=14$.



Opp $9y+1 = 10y-13$ Because opp ∠s of a ▱ ≅

$14 = y$

$9(14)+1 \stackrel{?}{=} (10(14)-13)$

$126+1$

$127 \stackrel{?}{=} 140-13$

$127 = 127$ So it is a ▱ because opp. ∠s ≅.

$9y+1 + 7x+4 = 180$

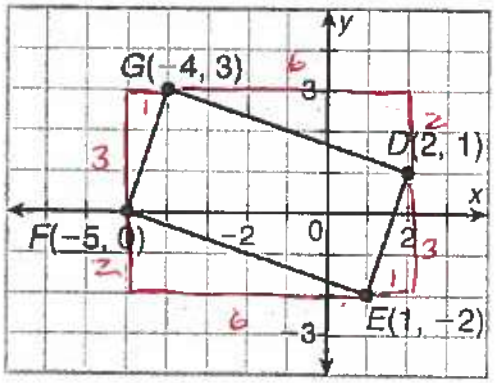
$9(14)+1 + 7(7)+4 = 180$

$126+1+49+4 = 180$

$180 = 180$

So it is a ▱ because consecutive angles are supplementary.

2. Tell whether the parallelogram is a rectangle, rhombus, or square. Justify your answer.



Length $a^2+b^2=c^2$ Slope $\frac{\text{rise}}{\text{run}}$

$GF = 1^2+3^2=c^2$ $GF = \frac{3}{1}$

$10 = c^2$

$c = \sqrt{10}$

$GD = 6^2+2^2=c^2$ $GD = \frac{-2}{6} = \frac{-1}{3}$

$36+4=c^2$

$40=c^2$

$c=\sqrt{40}$

$ED = 1^2+3^2=c^2$ $ED = \frac{3}{1} =$

$10=c^2$

$c=\sqrt{10}$

$EF = 2^2+6^2=c^2$ $EF = \frac{-2}{6} = \frac{-1}{3}$

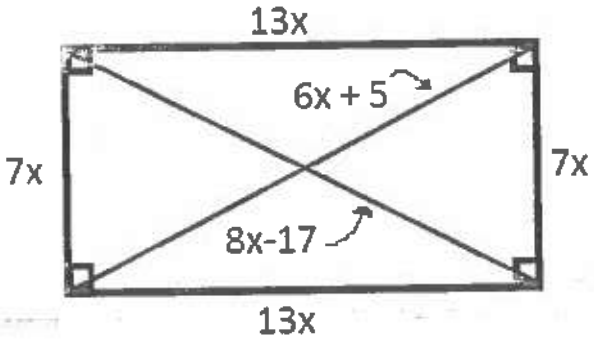
$40=c^2$

$c=\sqrt{40}$

It is a Rectangle

Because
- opp sides ≅
- Consecutive sides ⊥

3. Use the figure to answer the questions below.



Part A: Mark the box next to all of the shapes shown in the above figure:

- ☑ ***Parallelogram***
- ☐ ***Square***
- ☐ ***Rhombus***
- ☐ ***Trapezoid***
- ☑ ***Rectangle***

Part B: Solve for x.

DIAGONALS OF A ▱ BISECT EACH OTHER
DIAGONALS OF A RECTANGLE ARE CONGRUENT;

SO, $8x-17 = 6x+5$

$2x = 22$

$\boxed{x = 11}$

Part C: Find the length of the quadrilateral's shorter sides.

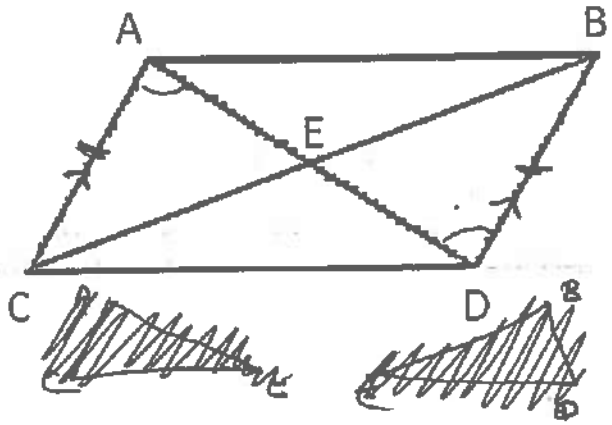
7x IS THE SHORTER SIDE

SO, $7(11) = 77$

$\boxed{77}$

4. **Given:** parallelogram *ABCD*

Prove: $\Delta ACE \cong \Delta DBE$

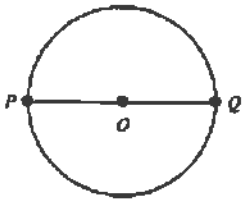


STATEMENT	REASON
(1) ABCD is a ▱	(1) Given
(2) $\overline{AC} \cong \overline{BD}$	(2) Opp. sides of a ▱ ≅.
(3) $\overline{AC} \parallel \overline{BD}$	(3) Opp sides of a ▱ are ∥.
(4) $\angle CAE \cong \angle BDE$	(4) alt. int ∠s ≅.
(5) $\overline{AE} \cong \overline{ED}$	(5) Diagonals of a ▱ bisect each other
(6) $\Delta ACE \cong \Delta DBE$	(6) SAS

Several other methods can be used.

II. G-CO.13 *Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.*

5. Justin is using a compass and straightedge to inscribe a regular hexagon inside circle O. His first step is to draw diameter $\overline{PQ}$. Describe Justin's next step in the construction of the hexagon.



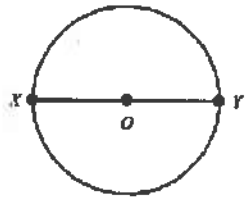
a Draw two more diameters that divide the circle into six equal pieces.

b Open the compass to a width greater than OQ, place the compass point at P and draw an arc. Then place the compass point at Q and draw an arc. Then use the intersections of the two arcs to draw a perpendicular bisector of $\overline{PQ}$.

c Open the compass to a width of OQ, put the compass point on P (or Q), and draw an arc that intersects the circle.

d Open the compass to a width of PQ, put the compass point on P (or Q), and draw an arc that intersects the circle.

6. Maria is using a compass and straightedge to inscribe a square inside circle O. Her first step is to draw diameter $\overline{XY}$. Describe Maria's next step in the construction.



a Open the compass to a width of OX, put the compass point on X, and draw an arc that intersects the circle.

b Open the compass to a width of diameter $\overline{XY}$, put the compass point on O, and draw four arcs of equal length along the circle.

c Open the compass to a width of OX, place the compass point at X, and draw an arc. Then place the compass point at O and draw an arc. Then use the intersections of the two arcs to draw a perpendicular bisector of $\overline{XY}$.

d Open the compass to a width greater than OX, place the compass point at X, and draw an arc. Then place the compass point at Y and draw an arc. Then use the intersections of the two arcs to draw a perpendicular bisector of $\overline{XY}$.

III. G-GPE.4 *Use coordinates to prove simple geometric theorems algebraically.*

7. The coordinates of the vertices of a quadrilateral are A (-4,5) B (3,1) C (2,-7) D (-5,-3)

Part A: How long is each side of the quadrilateral? Show your work.

Part B: What are the slopes of each side of the quadrilateral? Show your work.

Part C: What type of quadrilateral is it? Explain your reasoning.