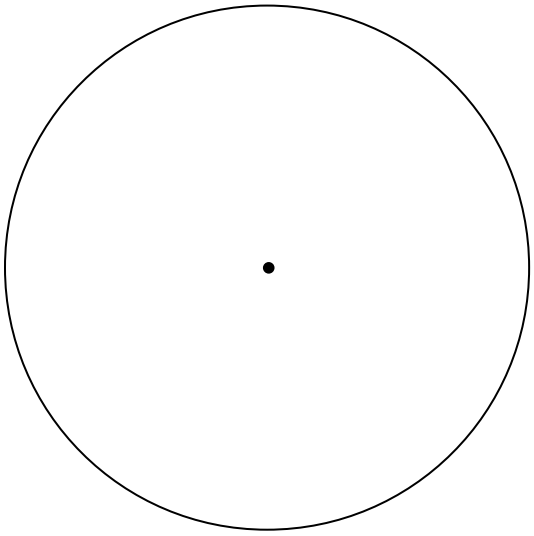
Unit 6 Review Geometry 2016-17

Name _____ Date: _____ Section:_____

CONSTRUCTION OF A SQUARE INSCRIBED IN A CIRCLE

Key Idea: Diagonals of a square are _____ _____ _____ of each other.



Steps:

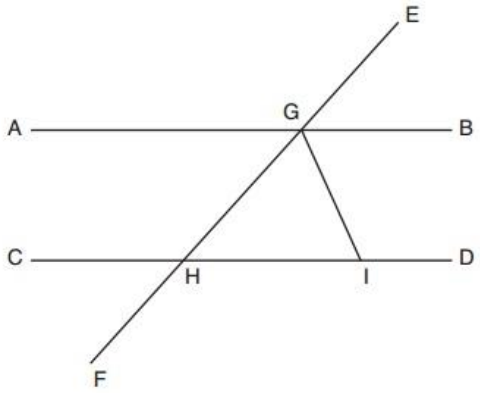
1) **Draw a _____.**
2) **_____ the diameter.**
3) **Connect the four points on the circle to make the _____ of the square.**

REVIEW PACKET

For each question make sure to write all formulas, substitutions, and show all work. Clearly label your work and clearly identify your answers.

1. If $\overline{IG}$ is translated such that I maps to H, which type of quadrilateral will be formed? _____

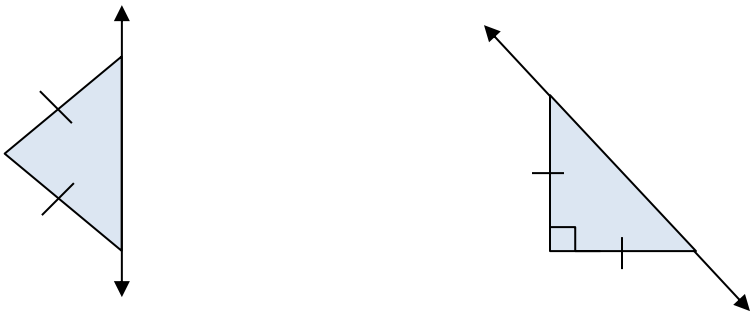
   a. Explain your reasoning:



   b. What will be the slope of $\overline{HG}$'? _____

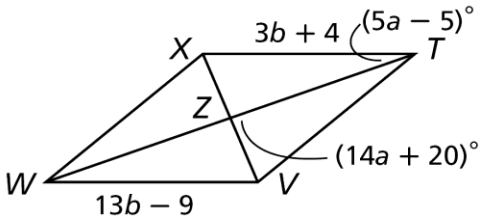
2. Name the type of quadrilateral that will be formed by reflecting the following triangles into the line:

   a. _____ b. _____



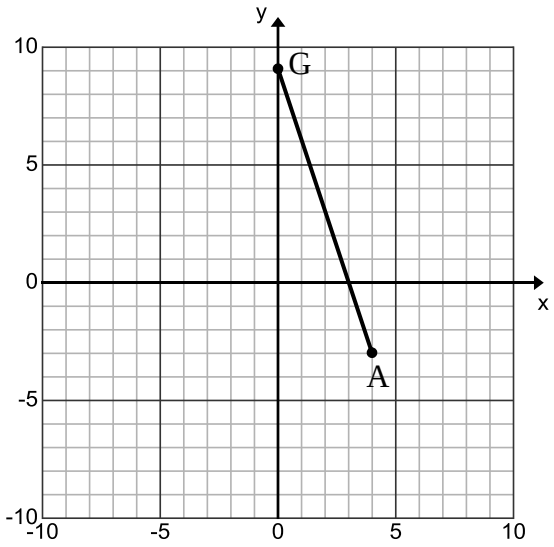
Unit 6 Review Geometry 2016-17

3. *TVWX* is a rhombus. Find the following:

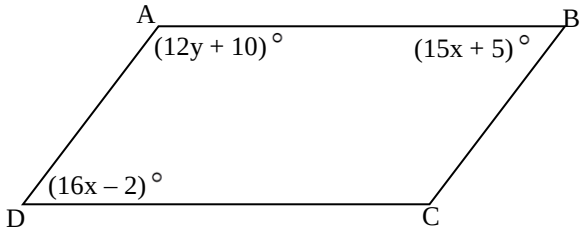


- *TV*
- m∠VTZ
- m∠XWV
- m∠ZVW

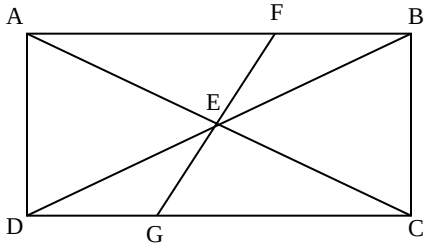
4. Write the equation of the line that contains the diagonal $\overline{RY}$ of rhombus GRAY with G(0,9) and A(4,-3):



5. Given $\square ABCD$, determine the value of y.

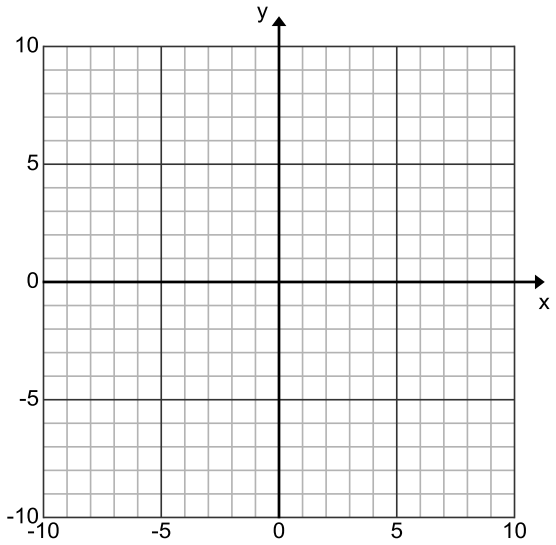


6. Given ABCD is a rectangle with $m\measuredangle DAC = 67°$ and $m\measuredangle FEB = 34°$, find $m\measuredangle AFE$.



7. Rhombus PNWL, $NW = 12$, and $m\angle WLP = 144°$. Find PN, $m\angle LWP$ and $m\angle PNW$. Draw and label a diagram to help justify your answer.

8. A quadrilateral has vertices with coordinates B(-3,1), S(0,3), P(5,2), and A(-1,-2). Classify the quadrilateral using coordinate geometry and explain your reasoning.



What would you calculate to prove BSPA is *not* an isosceles trapezoid? Give two options:

1. _____ 2. _____

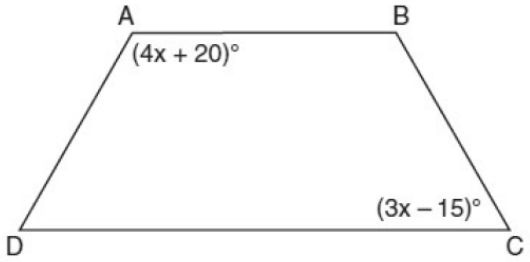
9. In rectangle ABCD with the diagonals intersecting at E, find the length of AE when $AC = 8x-3$ and $BD = 4x+17$. Be sure to draw a diagram first!

10. The diagonals of a rhombus measure 8 inches and 16 inches, respectively. What is the perimeter of the rhombus? Write your answer in simplest radical form.
(Draw and label a diagram to justify your answer.)

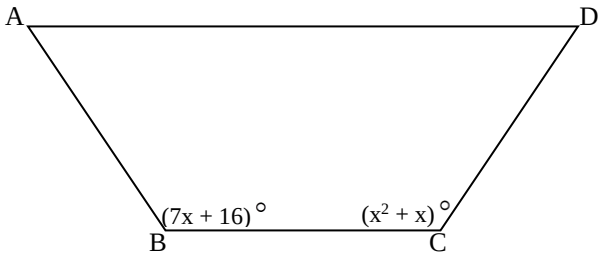
11. In parallelogram ABCD, the diagonals $\overline{AC}$ and $\overline{DB}$ intersect at E. Draw a picture and determine which statement must be true:

    1. $\overline{AC} \cong \overline{DB}$
    2. $\angle ABD \cong \angle CBD$
    3. $\Delta AED \cong \Delta CEB$
    4. $\Delta DCE \cong \Delta BCE$

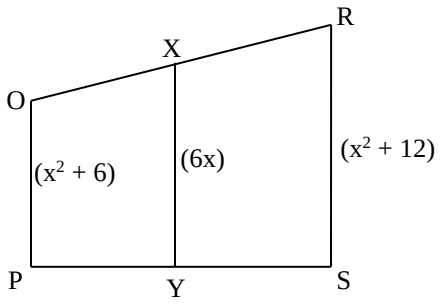
12. In the diagram of trapezoid ABCD, $\overline{AB} \parallel \overline{DC}, \overline{AD} \cong \overline{BC}$.
If $m\measuredangle A = (4x + 20)°$ and $m\measuredangle C = (3x - 15)°$, find $m\measuredangle D$.



13. Find the value(s) of *x* so that ABCD is an isosceles trapezoid with bases $\overline{AD}$ and $\overline{BC}$.



14. $\overline{XY}$ is the midsegment of the trapezoid. Find the value of x.



15. Quadrilateral ABCD has diagonals $\overline{AC}$ and $\overline{DB}$. What information is *not* sufficient to prove ABCD is a parallelogram?
   A. $\overline{AC}$ and $\overline{DB}$ bisect each other
   B. $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{AD}$
   C. $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{CD}$
   D. $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$

16. In quadrilateral ABCD, the diagonals bisect its angles. If the diagonals are *not* congruent, quadrilateral ABCD must be a
   A. Square B. Rectangle C. Rhombus D. Trapezoid

17. Quadrilateral $MNOP$ is a trapezoid with $\overline{MN} \parallel \overline{OP}$. If $M'N'O'P'$ is the image of $MNOP$ after a reflection over the x-axis, which two sides of quadrilateral $M'N'O'P'$ are parallel?
   1. $\overline{M'N'}$ and $\overline{O'P'}$
   2. $\overline{M'N'}$ and $\overline{N'O'}$
   3. $\overline{P'M'}$ and $\overline{O'P'}$
   4. $\overline{P'M'}$ and $\overline{N'O'}$

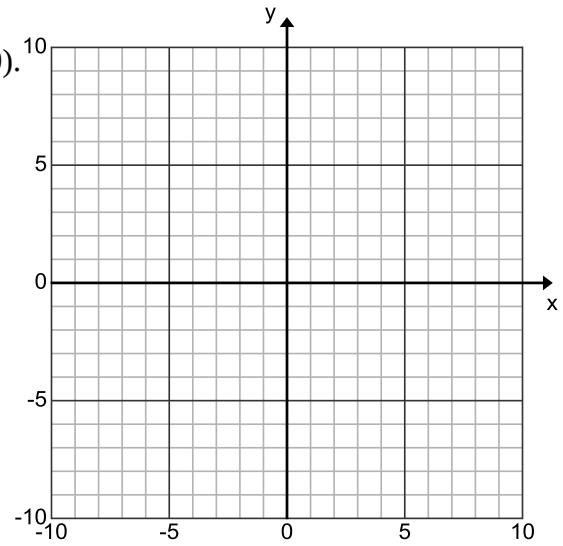
18. When a quadrilateral is reflected over the line $y=x$, which geometric relationship is *not* preserved?
   A. Congruence B. Orientation C. Parallelism D. Perpendicularity

19. If the diagonals of a quadrilateral are congruent but do not bisect each other, the quadrilateral may be a(n):
   A. Rectangle B. Isosceles Trapezoid C. Rhombus D. Square

20. In quadrilateral ABCD, each diagonal bisects opposite angles. If the $m\angle DAB = 70°$, then ABCD must be a
   A. Rectangle
   B. Trapezoid
   C. Rhombus
   D. Square

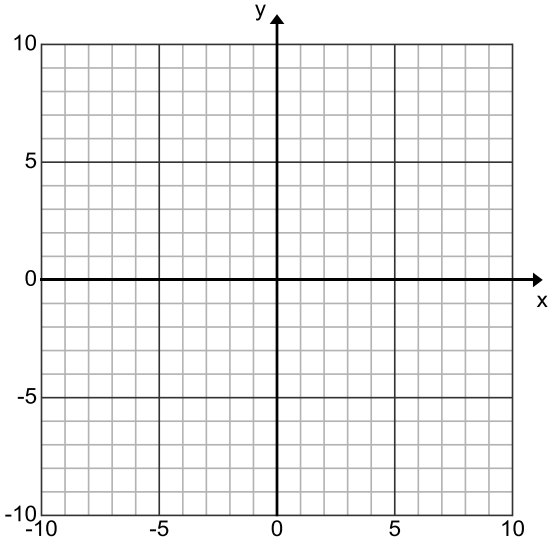
21. In rhombus ABCD, diagonals $\overline{AC}$ and $\overline{DB}$ intersect at E. What kind of angle is $\measuredangle DAE$?
    A. Acute
    B. Straight
    C. Right
    D. Obtuse

22. Three vertices of parallelogram DFGH are D(-9,4), F(-1,5) and G(2,0).
    A. Write the equation of the line that contains the side of the parallelogram through vertex H.



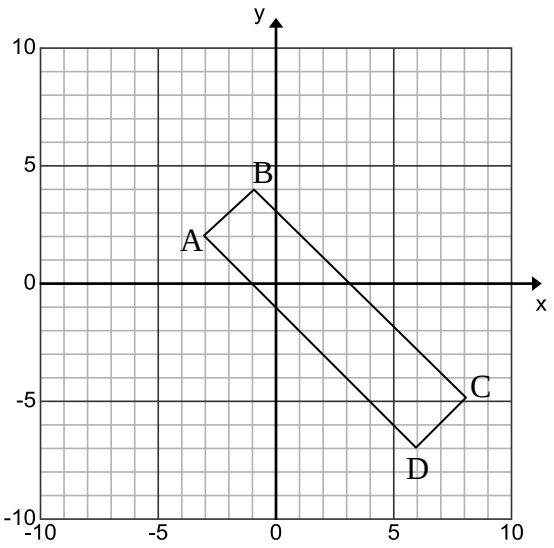
    B. State the coordinates of vertex H.

23. State the coordinates of vertices H and P of square HAPY given A(0,5) and Y(-10,-1).



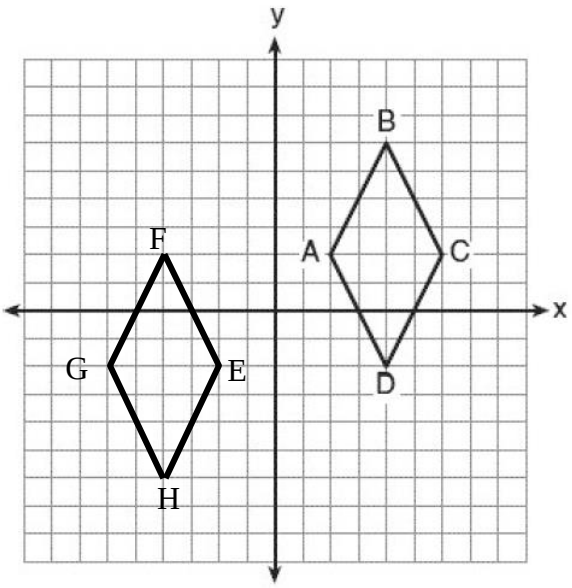
Unit 6 Review Geometry 2016-17

24. Prove quadrilateral ABCD with vertices A(-3,2), B(-1,4), C(8,-5), and D(6,-7) is a rectangle. Make sure to show all of your work including formulas, substitutions, etc. Clearly label your work.



25. Given quadrilateral ABCD and its image EFGH

A. Describe a sequence of rigid motions that maps ABCD onto EFGH. Be specific.



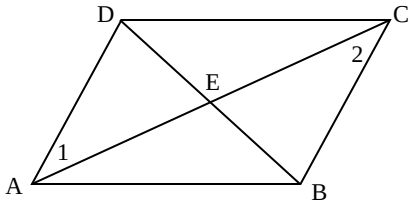
B. List the properties that are preserved under all rigid motions:

1. _____ 2. _____
3. _____ 4. _____

C. Fill in the blanks:

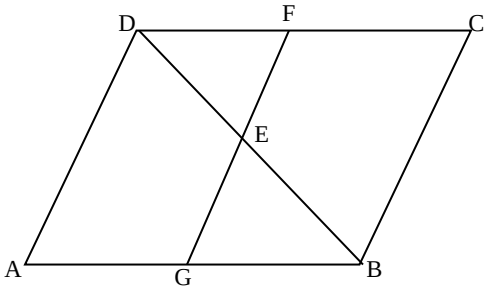
- $\measuredangle A \cong$ _____.
- If $\overline{AB} \cong \overline{BC}$, then $\overline{EF} \cong$ ____.
- If $\overline{AB} \parallel \overline{DC}$, then $\overline{EF} \parallel$ ____.

26. Given: $\overline{DB}$ bisects $\overline{AC}$. $\measuredangle 1 \cong \measuredangle 2$.
Prove: ABCD is a parallelogram
Hint: first prove $\Delta ADE \cong \Delta CBE$ *and use CPCTC*



27. Given: ABCD is a parallelogram
$\overline{FG}$ bisects $\overline{DB}$

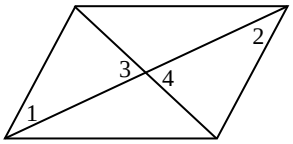
Prove: $\overline{FE} \cong \overline{GE}$
Hint: first prove $\Delta DEF \cong \Delta BEG$ *then use CPCTC*



Review Packet Unit 6 Answer Key

<table>
<tr><td colspan="2">1. Parallelogram a. Translations preserve distance and slope so $\overline{IG} \cong \overline{HG}'$ & $\overline{IG} \parallel \overline{HG}'$. A quad w/1 pair of opp sides parallel & congruent is a parallelogram. (Could also use parallel and congruent translation vectors) b. the same slope as $\overline{IG}$</td><td colspan="2">2. a. Rhombus (4 congruent sides and perpendicular diagonals).
b. Square (4 congruent sides → parallelogram and rhombus, 1 right angle → rectangle)</td></tr>
<tr><td rowspan="2">3. $TV = 7.9$
$m\measuredangle VTZ = 20°$
$m\measuredangle XWV = 40°$
$m\measuredangle ZVW = 70°$</td><td>4. $y - 3 = \frac{1}{3}(x-2)$</td><td>6. $m\measuredangle AFE = 57°$</td><td rowspan="2">8. BSPA is a trapezoid since one set of opposite sides are parallel ($\overline{BS} \parallel \overline{PA}$);
1. $\overline{BP} \cong \overline{SA}$ (congruent diagonals) or
2. $\overline{SP} \cong \overline{BA}$ (congruent legs)</td></tr>
<tr><td>5. y=5</td><td>7. PN=12
$m\measuredangle LWP = 18°$
$m\measuredangle PNW = 144°$</td></tr>
<tr><td rowspan="2">9. AE=18.5 (x=5)</td><td>10. Perimeter = $16\sqrt{5}$ inches</td><td colspan="2">12. $m\measuredangle D = 60°$ $(x = 25)$</td><td>14. x=3</td></tr>
<tr><td>11. 3</td><td colspan="2">13. x = 8 or x = -2 (Both check)</td><td>15. D</td></tr>
<tr><td>16. C</td><td>18. B</td><td>20. C</td><td colspan="2" rowspan="2">22. A) || to $\overline{DF}: y - 0 = \frac{1}{8}(x-2)$
|| to $\overline{FG}: y - 4 = -\frac{5}{3}(x+9)$
B) H(-6,-1)</td></tr>
<tr><td>17. 1</td><td>19. B</td><td>21. A</td></tr>
<tr><td colspan="5">23. H and P are located at (-8,7) and (-2,-3) (note, they are interchangeable)</td></tr>
<tr><td colspan="5">24. Answers will vary depending on method chosen to prove parallelogram and then rectangle. Examples:
• 1st prove parallelogram:
○ Since the slopes of $\overline{AB}$ & $\overline{CD}$ = -1 and the slopes of $\overline{BC}$ & $\overline{AD}$ =1, then $\overline{AB} \parallel \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$. Since both sets of opposite sides are ||, then quadrilateral ABCD is a parallelogram.
○ Since AB= $2\sqrt{2}$ =CD and BC= $9\sqrt{2}$ =AD, then $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{AD}$. Since both sets of opposite sides are congruent, then quadrilateral ABCD is a parallelogram.
○ Since the midpoints of $\overline{BD}$ & $\overline{AC}$ are both (2.5, -1.5), then the diagonals bisect each other so quad ABCD is a ▱.
• 2nd prove rectangle:
○ Since the slopes of $\overline{AB}$ =1 & $\overline{BC}$ =-1 are opposite reciprocals, then $\overline{AB} \perp \overline{BC}$. Since $\measuredangle B$ is a right $\measuredangle$, then parallelogram ABCD is a rectangle.
○ Since AC= $\sqrt{170}$ =BD, then $\overline{AC} \cong \overline{BD}$. Since the diagonals are congruent, then parallelogram ABCD is a rectangle.</td></tr>
<tr><td colspan="2">25. A. Examples:
Line reflection over the y-axis followed by a translation <0,-4> (down 4);
Translation of <-4,-4> followed by a reflection over the line x = -2</td><td colspan="2">B. Angle Measure, Distance, Parallelism, Perpendicularity</td><td>C. $\measuredangle E$"
$\overline{FG}$
$\overline{HG}$</td></tr>
</table>

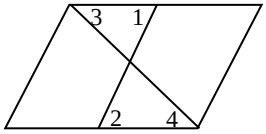
15. Prove ABCD is a parallelogram



1. $\measuredangle 1 \cong \measuredangle 2$	1. Given
2. $\overline{AD} \parallel \overline{CB}$	2. $\cong$ alt int $\measuredangle$'s $\rightarrow \parallel$ *lines*
3. $\overline{DB}$ bisects $\overline{AC}$	3. Given
4. $\overline{EA} \cong \overline{EC}$	4. Segment bisector → 2 congruent segments
5. $\measuredangle 3 \cong \measuredangle 4$	5. Vertical angles are congruent
6. $\Delta ADE \cong \Delta CBE$	6. $ASA \cong ASA \rightarrow \cong \Delta$'s (1,5,7)
7. $\overline{AD} \cong \overline{CB}$	7. CPCTC
8. ABCD is a parallelogram	(steps 7&2) 8. Quadrilateral w/1 set of opposite sides $\cong$ & $\parallel \rightarrow \square$

Note: could also use CPCTC to get diagonals bisect each other using $\overline{DE} \cong \overline{BE}$.

16. Prove $\overline{FE} \cong \overline{GE}$



1. ABCD is a parallelogram	1. Given
2. $\overline{DC} \parallel \overline{AB}$	2. $\square \rightarrow$ opposite sides $\parallel$
3. $\measuredangle 1 \cong \measuredangle 2; \measuredangle 3 \cong \measuredangle 4$	3. $\parallel$ lines $\rightarrow$ alt int $\measuredangle$'s $\cong$
4. $\overline{FG}$ bisects $\overline{DB}$	4. Given
5. $\overline{DE} \cong \overline{BE}$	5. Segment bisector → 2 congruent segments
6. $\Delta DEF \cong \Delta BEG$	6. AAS $\cong$ AAS (4, 4, 6)
7. $\overline{FE} \cong \overline{GE}$	7. CPCTC

Note: could instead use vertical angles and ASA$\cong$.