Name Key Hour ____________

Polygon Unit Test Review 2015 RTI

Directions: You must show all work for all problems below. For the problems where you have a quadrilateral and use their properties, justify the set up, and provide the geometry. (Some may not have the information to do everything i.e. if no points are there, you cannot show the geometry). Failure to do so will result in a zero.

1. Find the sum of the measures of the interior angles of a convex 39-gon.

$S = 180(39-2)$

$S = 6660°$

Sum of interior Angles

$S = 180(n-2)$

2. Find the sum of the measures of the exterior angles of a convex 21-gon.

$S = 360°$

Sum of Exterior angles

Always! 360°

3. Find the measure of an interior angle of a regular polygon with 20 sides. Round to the nearest tenth if necessary.

$\frac{180(20-2)}{20} = 162°$

one interior angle $= \frac{180(n-2)}{n}$

4. Find the measure of each exterior angle for a regular heptagon. Round to the nearest tenth if necessary.

$\frac{360}{7} = 51.4°$

one ext. ∠ $= \frac{360}{n}$

5. A regular polygon has an exterior angle with a measure of 20°. Find the number of sides.

$\cancel{n} \cdot \frac{360}{\cancel{n}} = 20° \cdot n$ $\quad \frac{360}{20} = \frac{\cancel{20}n}{\cancel{20}}$

$n = 18$ sides

6. A regular polygon has an interior angle with a measure of 120°. Find the number of sides.

$\cancel{n} \cdot \frac{180(n-2)}{\cancel{n}} = 120n$

$180(n-2) = 120n$

$180n - 360 = 120n$

$-180n \qquad -180n$

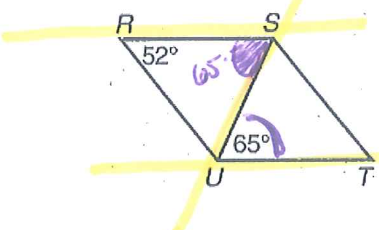
$\frac{-360}{-60} = \frac{-60n}{-60}$

6 sides $= n$

7. Fill in the following table:

Number of Sides	Name of Polygon
3	triangle
4	quadrilateral
5	pentagon
6	hexagon
7	heptagon
8	octagon
9	nonagon
10	decagon
11	undecagon
12	dodecagon
n	n - gon

8. For parallelogram *RSTU*, find $m\angle RSU$ and $m\angle RUS$.



$\angle RSU = 65°$ because of alt. interior angles are ≅

$\angle RUS + 65 + 52° = 180°$
$\angle RUS + 117 = 180°$
$-117 \quad -117$
$\angle RUS = 63°$

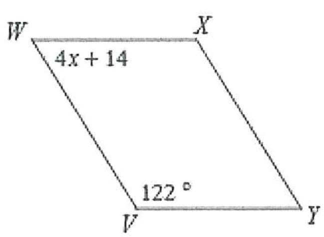
Δ Sum thm.

$m\angle RSU =$ 65° look here

$m\angle RUS =$ 63°

9. Solve for the missing angle or variable for the following PARALLELOGRAMS.

a.) Find x.



con. int. ∠s are suppl.

$\angle W + \angle V = 180°$

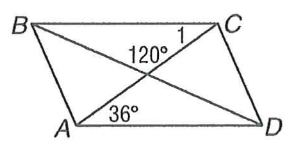
$4x + 14 + 122 = 180°$

$4x + 136 = 180$
$-136 \quad -136$

$\frac{4x}{4} = \frac{44}{4}$

$\boxed{x = 11}$

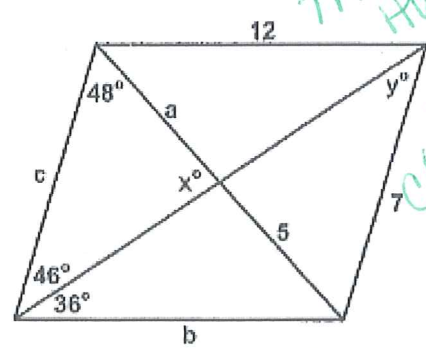
b) Find m<1.



alt. int ∠s are ≅

$\angle 1 = 36°$

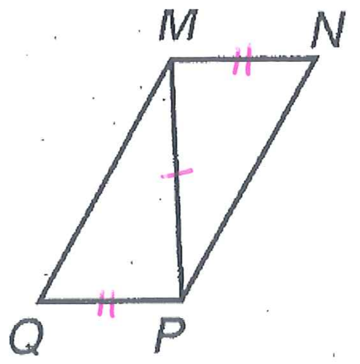
C. Find all variables.



This is on HW + notes from class

a = 5 diags bisect each other
b = 12 op. sides are ≅
c = 7 op sides are ≅
x = 86° Δ Sum
y = 46° alt. int ∠s are ≅

10. Find x so that the quadrilateral is a parallelogram. Then find the side length of MP, QP, and MN.



$QP = MN$ op. sides are $\cong$

$4x = 5x - 6$

$-5x \quad -5x$

$-1x = -6$

$x = 6$

$MP = 9x + 6$

$QP = 4x$

$MN = 5x - 6$

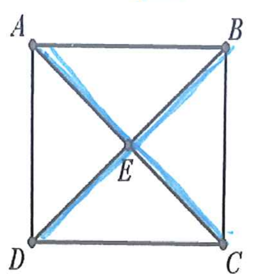
$MP = 9(6) + 6 = 60$

$QP = 4(6) = 24$

$MN = 5(6) - 6$

x = 6   MP = 60   QP = 24   MN = 24

11. ABCD is a square. If AC = 16 and BD = 2x + 4, find x.



diags of a square are $\cong$

$AC = BD$

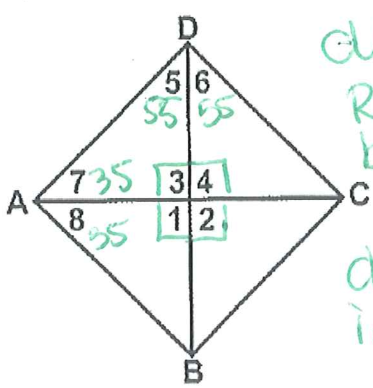
$16 = 2x + 4$

$12 = 2x$

$\boxed{6 = x}$

12. Rhombus Practice:

a.) For rhombus *ABCD*, $m\angle 8 = 35$, find the $m\angle 1$, $m\angle 2$, $m\angle 3$, $m\angle 4$, $m\angle 5$, $m\angle 6$, and $m\angle 7$.



diags. of a Rhombus bisect the angles and diags are $\perp$ in a Rhombus

$m\angle 1 =$ 90°

$m\angle 2 =$ 90°

$m\angle 3 =$ 90°

$m\angle 4 =$ 90°

$m\angle 5 =$ 55°

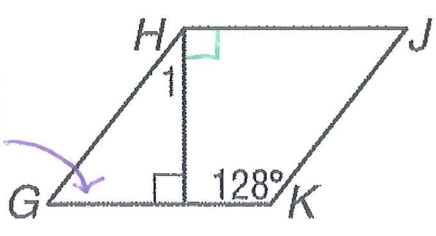
$m\angle 6 =$ 55°

$m\angle 7 =$ 35°

b.) For rhombus *GHJK*, find $m\angle 1$

180-128

52°



Δ sum

$\angle 1 + 90 + 52 = 180°$

$\angle 1 + 142 = 180$

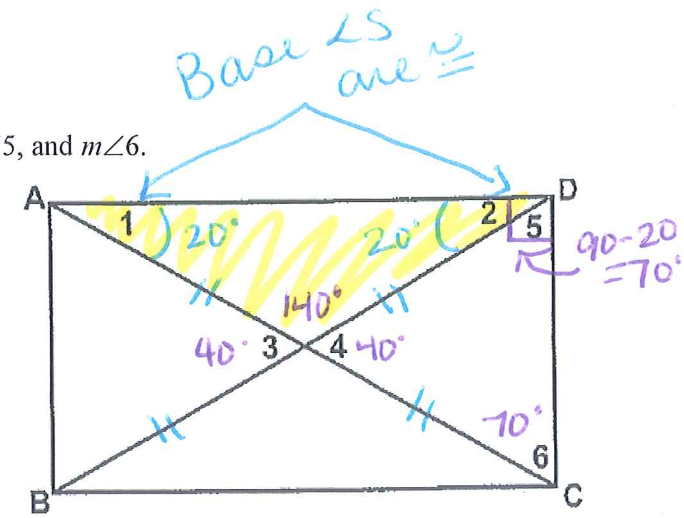
$\angle 1 = 38°$

13. ABCD is a rectangle. If $m\angle 1 = 20$, find the $m\angle 2$, $m\angle 3$, $m\angle 4$, $m\angle 5$, and $m\angle 6$.

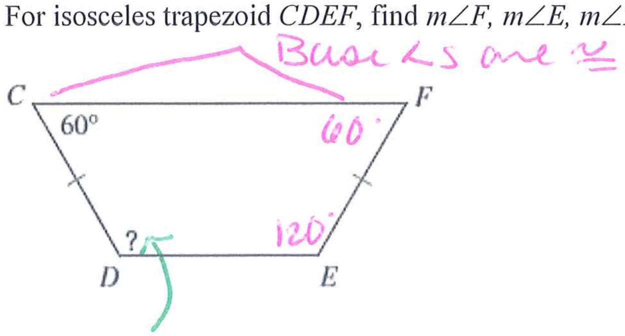
$m\angle 2 =$ 20°　　$m\angle 3 =$ 40°

$m\angle 4 =$ 40°　　$m\angle 5 =$ 70°

$m\angle 6 =$ 70°



14. For isosceles trapezoid $CDEF$, find $m\angle F$, $m\angle E$, $m\angle D$, and EF.

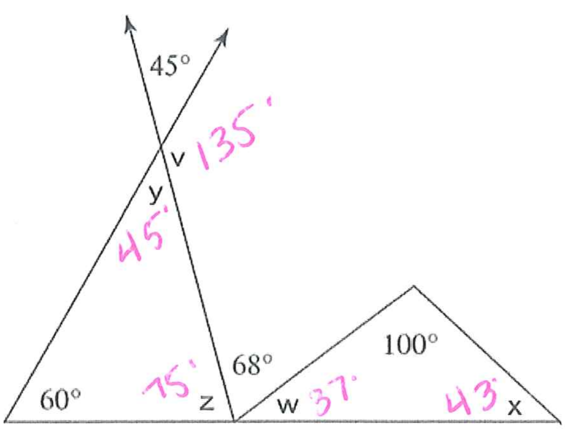


180-60
=120°
con. int ∠s are suppl.

m∠F = 60°　　m∠D = 120°

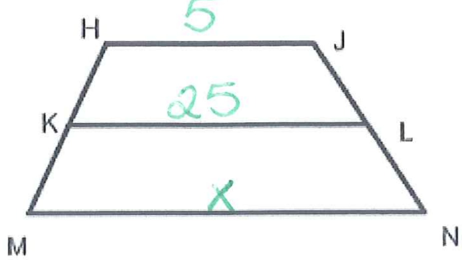
m∠E = 120°　　EF = CD

15. Find all of the missing angles.



v = 135°　　w = 37°　　x = 43°　　y = 45°　　z = 75°

16. LK is the midsegment of trapezoid HJNM. Find MN if HJ = 5 and LK = 25.



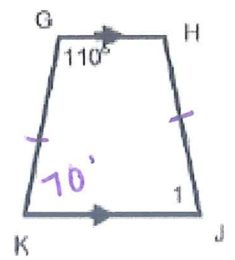
$25 = \frac{1}{2}(5 + x)$

$25 = 2.5 + 0.5x$

$\frac{22.5}{0.5} = \frac{0.5x}{0.5}$

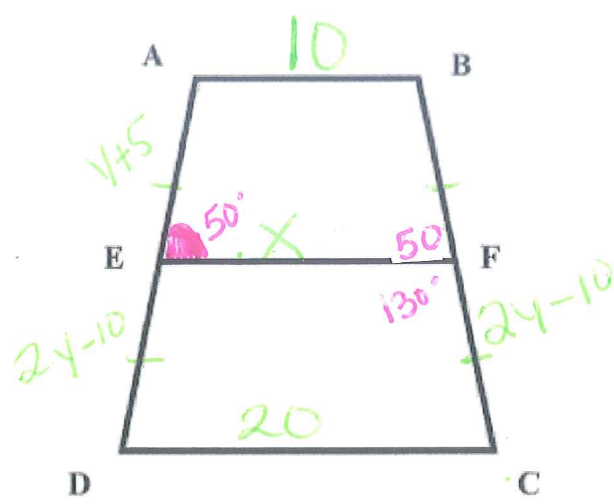
$\boxed{x = 45}$

17. For isosceles trapezoid GHJK, find <1.



$\angle 1 = 70°$

18. Given isosceles trapezoid ABCD, EF is the midsegment. Find EF, AD, and m<AEF if AB=10, CD = 20, AE = y + 5, FC = 2y – 10, and m<EFC =130



$EF = \frac{1}{2}(10 + 20)$

$EF = \frac{1}{2} 30$

$EF = 15$

$AE = ED$

$y + 5 = 2y - 10$

$15 = y$

$AE = 15 + 5$

$AE = 20$

$\boxed{AD = 40}$

EF = 15

AD = 40

m<AEF = $180° - 130$

$= 50°$ linear Pairs.

19. For isosceles trapezoid *MNOP*, find m<M, m<O, m<QNO and *m∠MNQ* if <P = 65°.

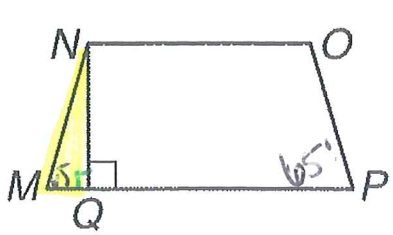
Base ∠s are ≅

$\angle M = 65°$

$\angle O = 115°$ con. int ∠s are Suppl.

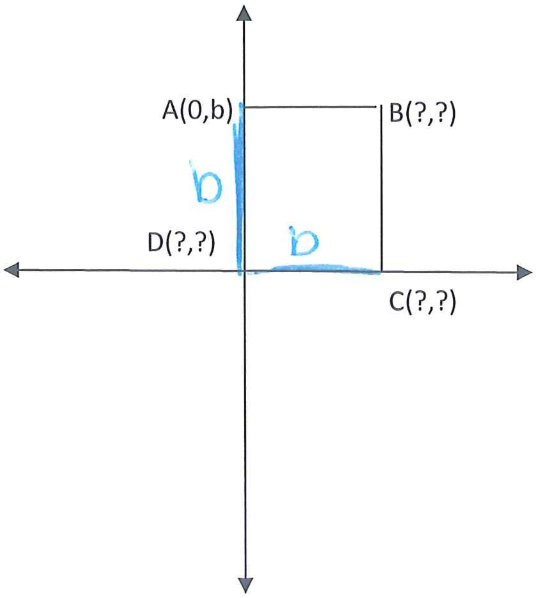
$\angle QNO = 90°$

$\angle MNQ = 25°$ by Δ Sum



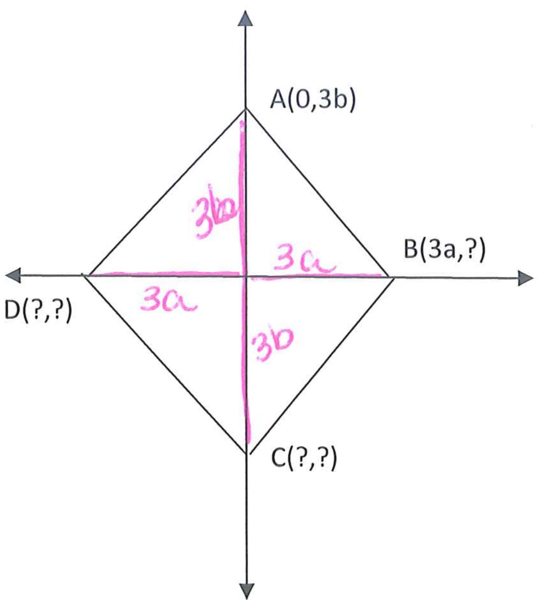
Δ Sum

20. Find all ? for the coordinates. ABCD is a square.



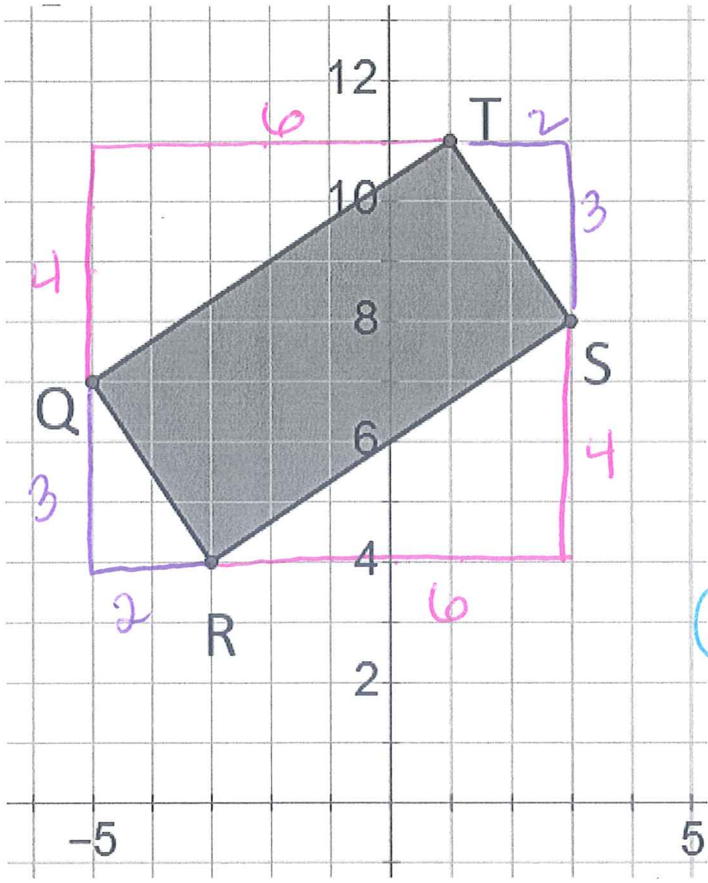
D (0,0)
C (b,0)
B (b,b)

21. Find all ? for the coordinates. ABCD is a rhombus.



B (3a, 0)
C (0, -3b)
D (-3a, 0)

22. Classify *QRST* with vertices Q(-5,7), R(-3, 4), *S*(3, 8), and *T*(1, 11). SHOW ALL WORK!!!! Show all distances, all slopes, find the area and perimeter of the figure.



Slope QT $= \frac{4}{6} = \frac{2}{3}$

Slope RS $= \frac{4}{6} = \frac{2}{3}$

Slope TS $= -\frac{3}{2}$

Slope QR $= -\frac{3}{2}$

$> \perp$

From Slopes we can conclude

1. Opposite sides are // because of the same slopes ∴ QRST is a parallelogram
2. Slopes are $\perp$ forming 4 Right ∠s ∴ QRST is a Rectangle.

distances

QT: $4^2 + 6^2 = QT^2$

$\boxed{\sqrt{52} = QT}$

QR: $3^2 + 2^2 = QR^2$

$\boxed{\sqrt{13} = QR}$

RS: $4^2 + 6^2 = RS^2$

$\boxed{\sqrt{52} = RS}$

ST: $3^2 + 2^2 = TS^2$

$\boxed{\sqrt{13} = TS}$

Perimeter

$\boxed{P = 2\sqrt{52} + 2\sqrt{13}}$

OR

$P = 4\sqrt{13} + 2\sqrt{13}$

$\boxed{P = 6\sqrt{13}}$

OR

$\boxed{P \approx 21.6}$

Area $A = l \cdot w$

$A = \sqrt{52} \cdot \sqrt{13}$

$A = \sqrt{676}$

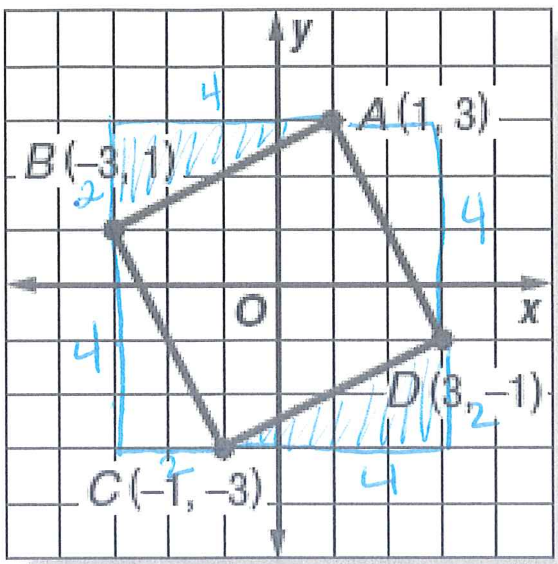
$\boxed{A = 26 \text{ units}^2}$

4 sides are not ≅

∴ NOT Rhombus or Square.

Exact question from #2 in notes.

23. Classify *ABCD* SHOW ALL WORK!!!! Show all distances, all slopes, find the area and perimeter of the figure.



Slope BC $= \frac{-4}{2} = -2$

Slope AD $= \frac{-4}{2} = -2$

Slope BA $= \frac{2}{4} = \frac{1}{2}$

Slope CD $= \frac{2}{4} = \frac{1}{2}$

BC // AD, BA // CD, op. sides are // because they have same slopes ∴ ABCD is a Parallelogram.

Slopes are ⊥ ∴ 4 Right ∠s. So ABCD is a Rectangle.

4 ≅ sides + 4 Right ∠s ∴ ABCD is a square

$P = 4\sqrt{20}$ OR $8\sqrt{5}$ or 17.9

Distances

$4^2 + 2^2 = AB^2$

$16 + 4 = AB^2$

$\boxed{\sqrt{20} = AB}$

$4^2 + 2^2 = AD^2$

$\boxed{\sqrt{20} = AD}$

$4^2 + 2^2 = BC^2$

$\boxed{\sqrt{20} = BC}$

$4^2 + 2^2 = CD^2$

$\boxed{\sqrt{20} = CD}$

4 ≅ sides ∴ ABCD is a Rhombus.

Area: $\sqrt{20} \times \sqrt{20}$

$A = 20 \text{ units}^2$