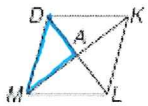
Name: Key Hour:_____

Rhombi and Squares Homework

Directions: Show all work and justify your work. Failure to do so will result in a zero.

Use rhombus $DKLM$ with $AM = 4x$, $AK = 5x - 3$, and $DL = 10$.



1. Find x.

$AM = AK$ diags of a Rhombus bisect each other

$4x = 5x - 3$

$x = 3$

2. Find AL.

$DL = AL + AD$ Segment addition

$DL = AL + AL$

$DL = 2AL$

$10 = 2AL$

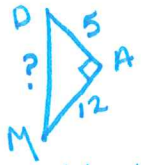
$5 = AL$

3. Find $m\angle KAL$.

$\angle KAL = 90°$ diags of a Rhombus are ⊥

4. Find DM.

must do pythagorean theorem



$12^2 + 5^2 = DM^2$

$169 = DM^2$

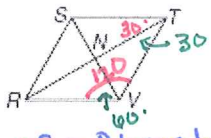
$\sqrt{169} = DM$

$13 = DM$

$AM = 4(3)$

$AM = 12$

Use rhombus $RSTV$ with $RS = 5y + 2$, $ST = 3y + 6$, and $NV = 6$. $\angle STN = 30°$ and $\angle RVT = 120°$



5. Find y.

$RS = ST$ def of Rhombus is all 4 sides ≅

$5y + 2 = 3y + 6$

$y = 2$

6. Find TV.

$TV = RS$ def of a Rhombus is all 4 sides ≅

$TV = 5(2) + 2$

$TV = 12$

7. Find $m\angle NTV$.

$\angle STN \cong \angle NTV$ diags of a Rhombus bisect the angles.

$\angle NTV = 30°$

8. Find $m\angle SVT$.

$\angle SVT = \frac{1}{2}\angle RVT$ diags of a Rhombus bisect the ∠s.

$\angle STV = \frac{1}{2}120$

$\angle STV = 60°$

9. Find $m\angle RST$.

$\angle RST \cong \angle RVT$ opposite ∠s of a Rhombus, which is a parallelogram are ≅

$\angle RST = 120°$

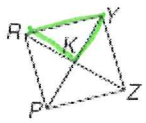
10. Find $m\angle SRV$.

$\angle STV = 30 + 30$ angle addition

$\angle SRV \cong \angle STV$ op. ∠s of a Rhombus (which is a parallelogram) are ≅.

$\angle SRV = 60°$

Use rhombus $PRYZ$ with $RK = 4y + 1$, $ZK = 7y - 14$, $PK = 3x - 1$, and $YK = 2x + 6$.



1. Find PY.

$PY = Pk + kY$ Segment addition

① Find x

$Pk = kY$ diagonals of a Rhombus bisect each other

$3x - 1 = 2x + 6$

$x = 7$

② $PY = 3(7) - 1 + 2(7) + 6$

$PY = 40$ units

2. Find RZ.

① Find y

$Rk \cong Zk$ diags of a Rhombus bisect each other

$4y + 1 = 7y - 14$

$5 = y$

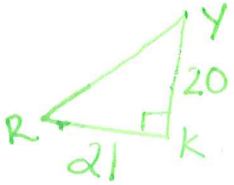
② Find RZ

$Rk + kZ = RZ$ Segment addition

$4(5) + 1 + 7(5) - 14 = RZ$

42 units $= RZ$

3. Find RY.



$kY = \frac{1}{2}40$ diags of a rhombus bisect each other

$Rk = \frac{1}{2}42$

use pythagorean thm

$20^2 + 21^2 = RY^2$

$\sqrt{841} = RY$

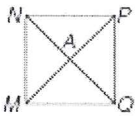
$29 = RY$

Square

4. Find $m\angle YKZ$.

$\angle YKZ = 90°$ diags of a Rhombus are $\perp$

Use rhombus $MNPQ$ with $PQ = 3\sqrt{2}$, $PA = 4x - 1$, and $AM = 9x - 6$. NQ = 6



5. Find AQ.

$AQ \cong \frac{1}{2}NQ$ diags of a square are $\cong$ and bisect each other

$AQ = 3$

6. Find $m\angle APQ$.

$\angle APQ = \frac{1}{2}\angle NPQ$ diags of a square bisect the $\angle$s.

$\angle APQ = \frac{1}{2}90$ ← def of a Square

$\angle APQ = 45°$

7. Find $m\angle MNP$.

$\angle MNP = 90°$ by def of a Square

8. Find PM.

$PM \cong NQ$ Diags of a square are $\cong$

$NQ = AQ + NA$ Segment addition

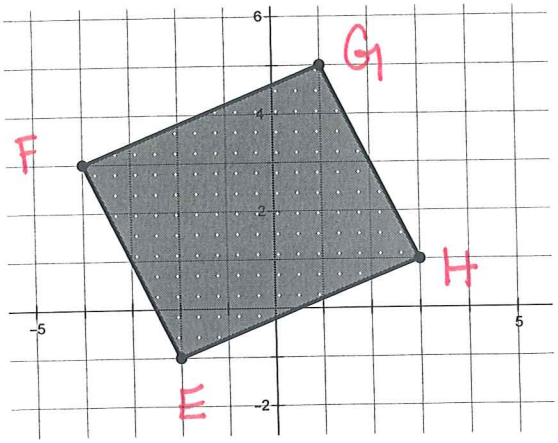
$NQ = 3 + 3$

$NQ = 6$

$PM = 6$ units

Show all work and follow all instructions. Failure to show work will result in a zero.

9. Determine whether the figure with vertices E(-2,-1), F(-4,3), G(1,5) H(3,1) is a rhombus. must check 4 ≅ sides



$FG^2 = 2^2+5^2$ $\quad$ $EH^2 = 5^2+2^2$

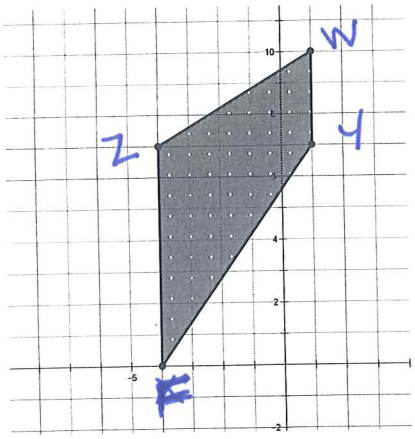
$FG = \sqrt{29}$ $\quad$ $EH = \sqrt{29}$

$GH = 2^2+4^2$ $\quad$ $FE = 4^2+2^2$

$GH = 2\sqrt{5}$ $\quad$ $FE = 2\sqrt{5}$

opp. sides are ≅ but not all 4 sides ≅ ∴ EFGH is NOT a Rhombus

10. Determine whether the figure with vertices W(1,10), F(-4,0), Y(1,7) Z(-4,7) is a rhombus. check 4 ≅ sides



$WZ^2 = 3^2+5^2$

$WZ = \sqrt{34}$

$YX^2 = 5^2+7^2$

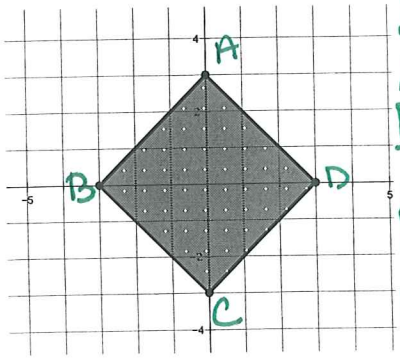
$FY = \sqrt{74}$

$WY = 3$

$FZ = 7$

No sides are ≅ ∴ WYFZ is is NOT a Rhombus

11. Determine whether the figure with vertices A(0,3), B(-3,0), C(0,-3), and D(3,0) is a square. check 4 ≅ sides and 4 Right ∠s



Distance

$AB^2 = 3^2+3^2 = 18$

$AB = 3\sqrt{2}$

$CD^2 = 3^2+3^2$

$CD = 3\sqrt{2}$

$BC^2 = 3^2+3^2$

$BC = 3\sqrt{2}$

$AD^2 = 3^2+3^2$

$AD = 3\sqrt{2}$

Slopes

Slope AB = 1

Slope AD = -1

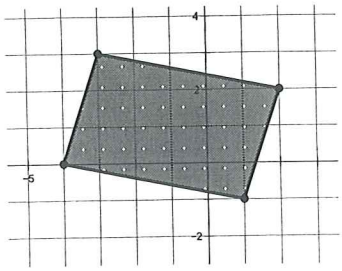
Slope CD = 1

Slope BC = -1

consecutive Slopes are ⊥

$AB \cong CD \cong BC \cong AD$ and all consecutive sides are ⊥ ∴ ABCD is a SQUARE by definition

12. Determine whether the figure with vertices A(-4,0), B(-3,3), C(2,2), and D(1,-1) is a square. check 4 ≅ sides and 4 Right ∠s



$BC^2 = 5^2+1^2$ $\quad$ $CD^2 = 3^2+1^2$

$BC = \sqrt{26}$ $\quad$ $CD = \sqrt{10}$

$BC \ncong CD$ ∴ ABCD cannot be a square by definition because all 4 sides must be ≅