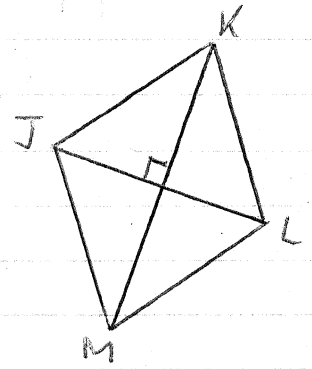
Geometry Ch 8-4 Exer, pg 531, #3-8, 9-14, 19-24, 26-29, 32-37, 38-43, 44-49

For any rhombus JKLM decide whether the statement is ALWAYS or SOMETIMES true.



3. $\angle L \cong \angle M$ Sometimes; JKLM would also have to be a square.

4. $\angle K \cong \angle M$ Always; as with all parallelograms, opposite angles are congruent.

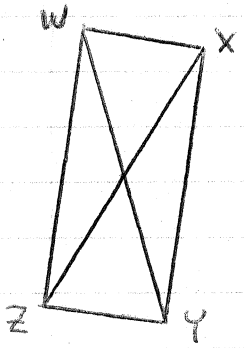
5. $\overline{JK} \cong \overline{KL}$ Always; by definition of a rhombus, all sides are congruent.

6. $\overline{JM} \cong \overline{KL}$ Always; again, all sides of rhombus are $\cong$.

7. $\overline{JL} \cong \overline{KM}$ Sometimes; JKLM would also have to be a square.

8. $\angle JKM \cong \angle LKM$ Always; the diagonals of a rhombus bisect the interior angles.

For any rectangle WXYZ, decide whether the statement is ALWAYS or SOMETIMES true.



9. $\angle W \cong \angle X$ Always; each of the four interior angles are 90°

10. $\overline{WX} \cong \overline{YZ}$ Always; as with any parallelogram, opposite sides are congruent.

11. $\overline{WX} \cong \overline{XY}$ Sometimes; WXYZ would also have to be a square.

12. $\overline{WY} \cong \overline{XZ}$ Always; by def'n, diagonals of a rectangle are congruent.

13. $\overline{WY} \perp \overline{XZ}$ Sometimes; WXYZ would also have to be a square.

14. $\angle WXZ \cong \angle YXZ$ Sometimes; interior angles will be bisected only if WXYZ is also a square.

Name each quadrilateral [Parallelogram, Rectangle, Rhombus, and Square] for which the statement is always true.

19. It is equiangular. Rectangle, Square

20. It is equiangular and equilateral. Square only

21. Diagonals are perpendicular. Rhombus, Square

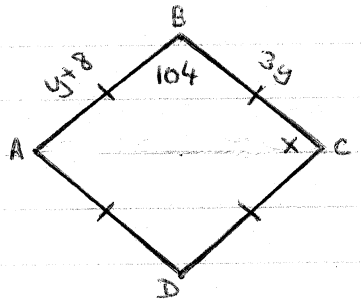
22. Opposite sides $\cong$. Parallelogram, Rectangle, Rhombus, Square

23. Diagonals bisect. Parallelogram, Rectangle, Rhombus, Square

24. Diagonals bisect opposite angles. Rhombus, Square

ALGEBRA: Find the values of x and y; classify the quadrilateral.

26.



$x + 104 = 180$

$x = 76$

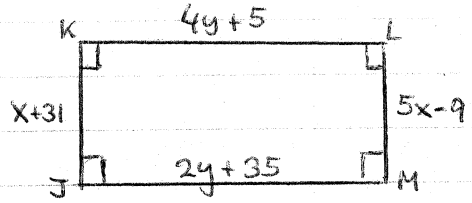
$y + 8 = 3y$

$8 = 2y$

$4 = y$

RHOMBUS; 4 $\cong$ sides.

27



$x + 31 = 5x - 9$

$40 = 4x$

$10 = x$

[side lengths are 41]

$4y + 5 = 2y + 35$

$2y = 30$

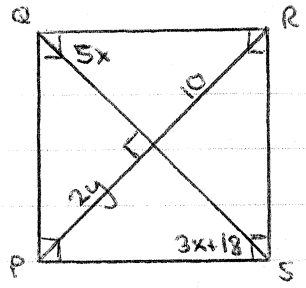
$y = 15$

[side lengths are 65]

RECTANGLE; 4 right angles

[Despite the drawing's appearance, this could have been a square.]

28.



With right angles at each vertex, and perpendicular diagonals, PQRS must be a Square.

$5x = 3x + 18$

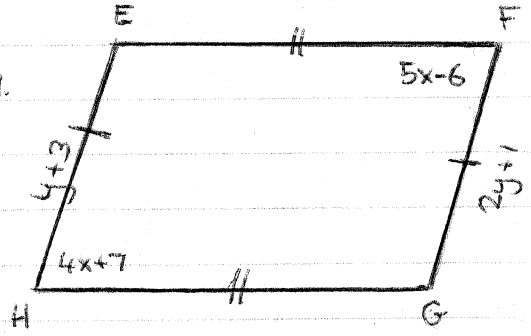
$2x = 18$

$x = 9$

$2y = 10$

$y = 5$

29.



With opposite sides congruent, EFGH is at least a parallelogram

$5x - 6 = 4x + 7$

$x = 13$

$\angle H = 59$

$\angle F = 59$

$\angle E = 121$

$\angle G = 121$

$2y + 1 = y + 3$

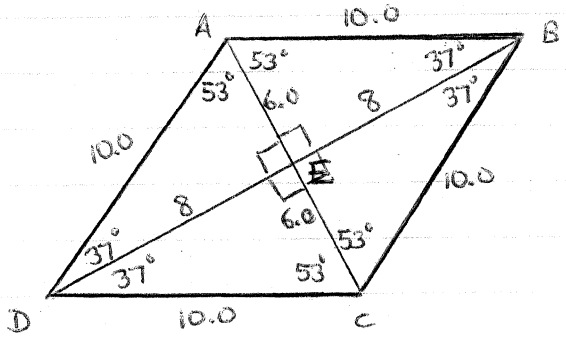
$y = 2$

$EH = 5$

$FG = 5$

While not drawn as such, it is <u>possible</u> that EFGH is a rhombus.

The diagonals of Rhombus ABCD intersect at E. Given that $m\angle BAC = 53°$ and $DE = 8$, find each indicated measure.



$$\begin{array}{r} 90 \\ +53 \\ \hline 143 \end{array} \qquad \begin{array}{r} 180 \\ -143 \\ \hline 37 \end{array}$$

$\cos 37 = \frac{8}{AD}$

$AD = \frac{8}{\cos 37}$

$AD = 10.0$

$\tan 37 = \frac{opp}{8}$

$8 \tan 37 = AE$

$6.0 = AE$

32. $m\angle DAC =$ 53°

33. $m\angle AED =$ 90°

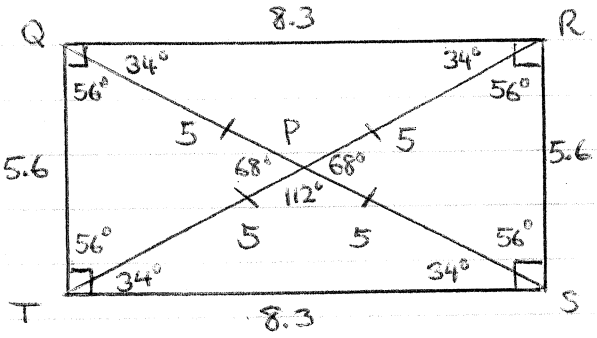
34. $m\angle ADC =$ 74°

35. $DB =$ 16

36. $AE =$ 6.0

37. $AC =$ 12.0

The diagonals of Rectangle QRST intersect at P. Given that $m\angle PTS = 34°$ and $QS = 10$, find each indicated measure.



$$\begin{array}{r} 56 \\ +56 \\ \hline 112 \end{array} \qquad \begin{array}{r} 180 \\ -112 \\ \hline 68 \end{array} \qquad \begin{array}{r} 180 \\ -68 \\ \hline 112 \end{array}$$

$\sin 56 = \frac{ST}{10}$

$10 \sin 56 = ST$

$8.3 = ST$

$\cos 56 = \frac{QT}{10}$

$10 \cos 56 = QT$

$5.6 = QT$

38. $m\angle SRT =$ 56°

39. $m\angle QPR =$ 112°

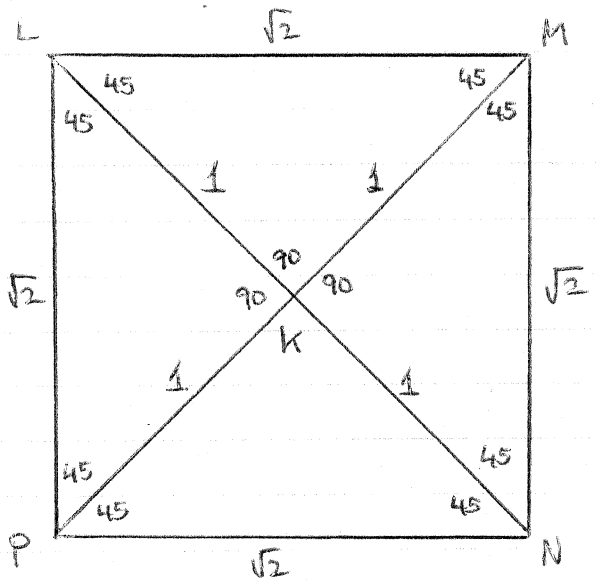
40. $QP =$ 5

41. $RP =$ 5

42. $QR =$ 8.3

43. $RS =$ 5.6

The diagonals of Square LMNP intersect at K. Given that LK = 1, find each indicated measure.



$1^2 + 1^2 = LM^2$

$2 = LM^2$

$\sqrt{2} = LM$

44. $m\angle MKN =$ $90°$

45. $m\angle LMK =$ $45°$

46. $m\angle LPK =$ $45°$

47. $KN =$ 1

48. $MP =$ 2

49. $LP =$ $\sqrt{2}$