

Name: _____
 7.4 Practice Problems

Classify each statement as true or false.

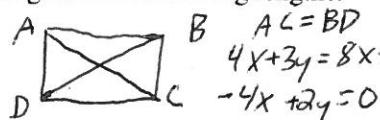
1. Opposite sides of a rectangle must be parallel. T
2. The diagonals of a rhombus must be perpendicular. T
3. Consecutive angles of a rhombus are always complementary. F
4. The diagonals of a rectangle are always perpendicular. F
5. Opposite sides of a parallelogram must be congruent. T
6. Each diagonal of a rectangle always bisects a pair of opposite angles. F

For 7-9, remember when drawing a polygon the vertices must go in the same order as the name.

7. Given Rectangle ABCD, find the length of the diagonals given the following lengths.

$$AC = 4x + 3y, BD = 8x + y, AB = 6x + y, CD = 2y + 4.$$

Bonus, find the perimeter.



$$\begin{aligned} x &= 2 \\ -4x + 2y &= 0 \\ 12x - 2y &= 8 \\ AB &= CD \\ 4x + 3y &= 8x + y \\ 6x + 2y &= 4 \\ 6x - 4 &= 4 \\ 6x &= 8 \\ x &= 1 \\ y &= 2 \end{aligned}$$

8. Given Rhombus WXYZ whose diagonals intersect and point A, find x and y given the following expressions for each angle measure. Angle WAZ = $2x + 3y$, angle XAY = $x + 6y$.

$$\begin{aligned} W &\quad Z \\ A &\quad Y \\ 2x + 3y &= 90 \\ -(x + 6y) &= 90 \\ -2x - 12y &= -180 \\ -9y &= -90 \\ y &= 10 \\ x &= 30 \end{aligned}$$

9. Given the perimeter of square GEOM is 48, find the length diagonal GO.

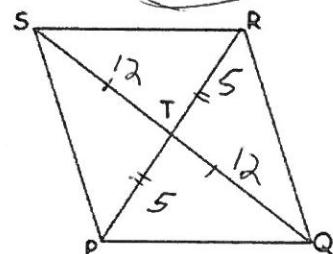
$$12 \rightarrow 12 \rightarrow 12 \rightarrow 12 \rightarrow X = 12\sqrt{2}$$

10. Use rhombus PQRST and the given information to find each value.

$$\text{If } SQ = 24, RP = 10, \text{ find } SR = 13 \quad (\text{Pythagorean Thm})$$

$$\text{If } m\angle PRS = 17, \text{ find } m\angle QRS = 34 \quad (\text{Diagonals Bisect Angles of Rhombus})$$

$$\text{Find } m\angle STR = 90^\circ$$



If $SP = 4x - 3$ and $PQ = 18 + x$, find the value of x .

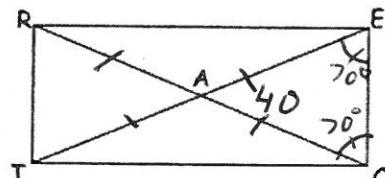
$$4x - 3 = 18 + x \quad \text{Equilateral}$$

$$3x = 21$$

$$X = 7$$

11. Use rectangle RECT and the given information to find each value.

$$m\angle RCT = 30^\circ, \text{ find } m\angle ETC = 30^\circ$$



If $RC = 5x + 2$ and $AE = x + 14$, find the value of x .

$$5x + 2 = 2(x + 14)$$

If $m\angle EAC = 40^\circ$, find $m\angle AEC$.

$$5x + 2 = 2x + 28$$

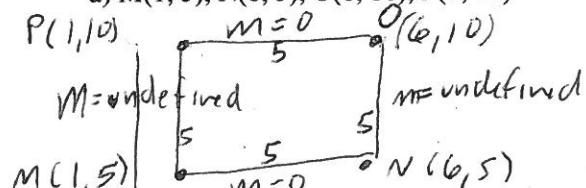
$$70^\circ$$

$$3x = 26$$

$$x = \frac{26}{3}$$

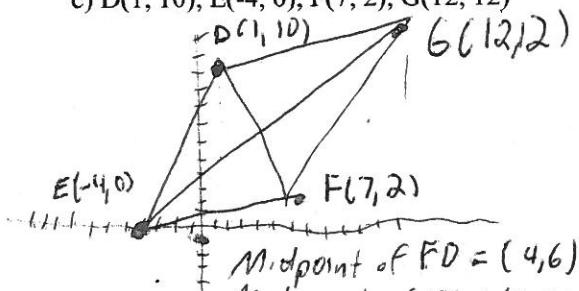
12. Determine whether each set of coordinates is a parallelogram, rectangle, rhombus or a square. You must provide a reason for your choice.

a) M(1, 5), N(6, 5), O(6, 10), P(1, 10)



- consecutive slopes are perpendicular.
- opp slopes are parallel.
- sides are equal!

c) D(1, 10), E(-4, 0), F(7, 2), G(12, 12)



Midpoint of FD = (4, 6) \rightarrow Parallelogram

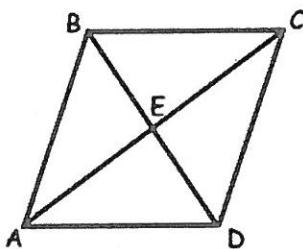
Midpoint of EG = (4, 6)

Slope of EG = $\frac{12}{16} = \frac{3}{4}$ \rightarrow Perpendicular

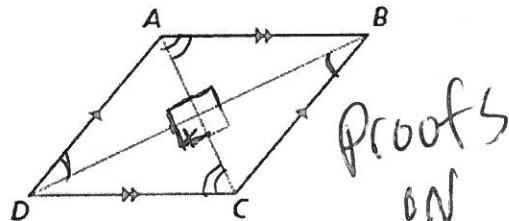
Slope of DF = $-\frac{8}{6} = -\frac{4}{3}$ \rightarrow Rhombus

13. Given rhombus ABCD, AB = $5x + y - 1$, BC = 18,

CD = $8x - 2y + 2$. Find x and y.



14.



Given ABCD is a parallelogram.
 $AC \perp BD$

Prove ABCD is a rhombus.

Proofs
on
Next
Page

b) W(5, 4), X(3, -6), Y(0, -10), Z(2, 0)

• opp sides ||

• consecutive angles

Not Perp.

• Diagonals

Not Perp. $M = 5$

Parallelogram

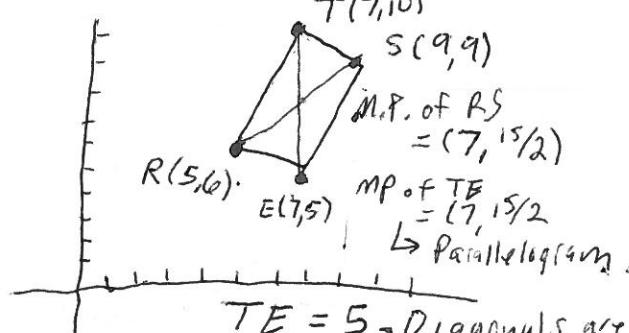
$MW(5, 4)$

ZX slope

$X(3, -6)$ YW slope

$= -6$ $= \frac{14}{5}$

d) R(5, 6), E(7, 5), S(9, 9), T(7, 10)



$S(9, 9)$

M.P. of RS

$= (7, \frac{15}{2})$

M.P. of TE

$= (7, \frac{15}{2})$

\hookrightarrow Parallelogram.

$TE = 5 \rightarrow$ Diagonals are
 $RS = 5$ equal \rightarrow

rectangle

$$5x + y - 1 = 18$$

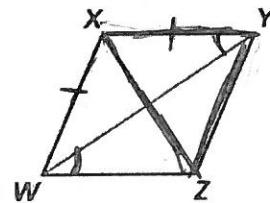
$$\begin{aligned} 5x + y &= 19 & \xrightarrow{x^2} 10x + 2y &= 38 \\ 8x - 2y + 2 &= 18 & 8x - 2y &= 16 \\ 8x - 2y &= 16 & 18x &= 54 \\ 18 & & 18 & \\ x &= 3 & & \end{aligned}$$

$$\begin{aligned} 5(3) + y - 1 &= 18 & y + 14 &= 18 \\ 15 + y - 1 &= 18 & y &= 4 \end{aligned}$$

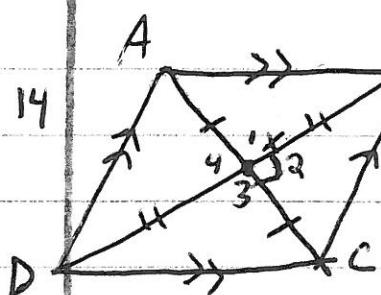
15. PROOF Write a proof in the style of your choice.

Given $\triangle XYZ \cong \triangle XWZ$, $\angle XYW \cong \angle ZWY$

Prove WXYZ is a rhombus.



14



\overline{ABCD} is a \square
 $\overline{AC} \perp \overline{BD}$

$\angle 1, \angle 2, \angle 3, \angle 4$ are Right Angles
 $AX = XC$ & $DX = XB$

Given

Def of Perpendicular.
 Diagonals bisect each other
 in a ~~Parallelogram~~ \square

$$\triangle DXC \cong \triangle BXG \cong \triangle BXA \cong \triangle DAX$$

$$\overline{AD} \cong \overline{AB} \cong \overline{BC} = \overline{DC}$$

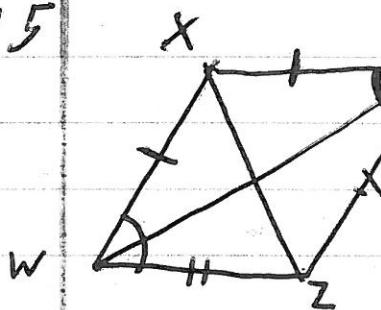
\overline{ABCD} is a rhombus

SAS

CPCTC

Definition of a
 Rhombus.

15



$$\angle XYZ \cong \angle XWZ$$

$$\angle XYW \cong \angle ZWY$$

$$XY = XW$$

$\triangle XYW$ is isosceles

$$\angle XWY \cong \angle XYW$$

$$YZ = WZ$$

$\triangle WZY$ is isosceles

$$\angle YWZ \cong \angle WYZ$$

~~$WY = WY$~~

$$\triangle XYW \cong \triangle ZYW$$

$$XY = YZ$$

$$WZ = XW$$

$$XY = YZ = ZW = WX$$

$\triangle XYZW$ is a rhombus

Given

CPCTC

Def of \triangle

Base Angles Thm

CPCTC

Def of \triangle

Base Angles Thm

Reflexive Prop.

ASA

CPCTC

CPCTC

Transitive Property
 Def of Rhombus.

