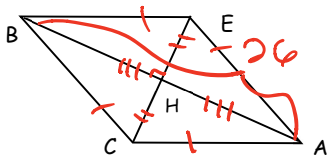
Quadrilaterals – Squares and Rhombi

Homework Section 6.5 Name_____

Use rhombus BEAC with BA = 26 to determine whether each statement is true or false. Justify your answer.



#1) CE = 26 False See last page for justification

#2) HA = 13 True

#3) $\overline{BA} \perp \overline{EC}$ True

#4) ΔBHE ≅ ΔAHC True

#5) m∠BEH = m∠EBH False

#6) ∠CBE and ∠BCA are supplementary True

Circle all the quadrilaterals – parallelogram, rectangle, rhombus, or square – that have each property.

#7) All angles are congruent.
parallelogram, rectangle, rhombus, or square

#8) The opposite sides are parallel.
parallelogram, rectangle, rhombus, or square

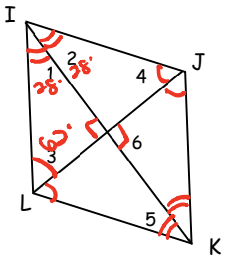
#9) All sides are congruent.
parallelogram, rectangle, rhombus, or square

#10) The opposite sides are congruent.
parallelogram, rectangle, rhombus, or square

#11) It is equiangular and equilateral.
parallelogram, rectangle, rhombus, or square

Use rhombus IJKL and the given information to solve each problem.

#12) If m∠3 = 62, find m∠1, m∠4, and m∠6.



$m\angle 1 + m\angle 3 + 90 = 180$

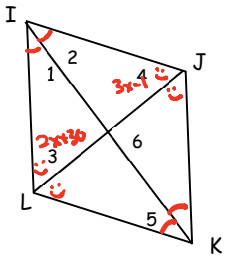
$m\angle 1 + (62) + 90 = 180$

$m\angle 1 + 152 = 180$

$m\angle 1 = 28$

$m\angle 6 = 90$ | $m\angle 4 = 62$

#13) If m∠3 = 2x + 30 and m∠4 = 3x – 1, find x.



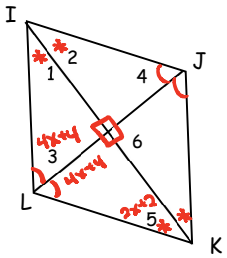
$m\angle 3 = m\angle 4$

$2x + 30 = 3x - 1$

$30 = x - 1$

$31 = x$

#14) If m∠3 = 4(x + 1) and m∠5 = 2(x + 1), find x.



$m\angle 3 + m\angle 5 + 90 = 180$

$(4x+4) + (2x+2) + 90 = 180$

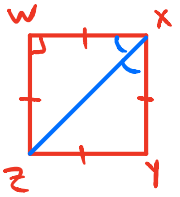
$6x + 6 + 90 = 180$

$6x + 96 = 180$

$6x = 84$

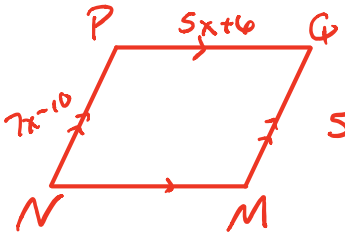
$x = 14$

#15) If WXYZ is a square, find m∠ZXY.



$m\angle ZXY = 45°$

#16) PQMN is a parallelogram. If PN = 7x – 10 and PQ = 5x + 6, for what value of x is PQMN a rhombus?



PQ = PN to be a rhombus

$5x + 6 = 7x - 10$

$6 = 2x - 10$

$16 = 2x$

$8 = x$

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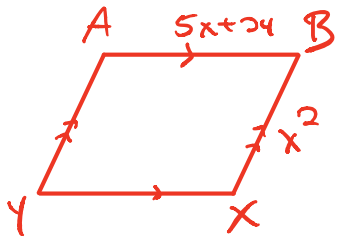
#17) ABXY is a parallelogram. If AB = 5x + 24 and BX = x^2, for what values of x is ABXY a rhombus?



$AB = XB$

$5x + 24 = x^2$

$0 = x^2 - 5x - 24$

$0 = (x-8)(x+3)$

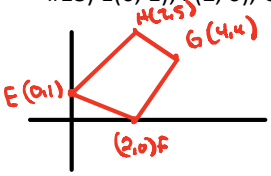
$0 = x - 8$ | $0 = x + 3$

$8 = x$ | $-3 = x$

$x = -3, 8$

Determine whether EFGH is a parallelogram, rectangle, rhombus, or square. List all that apply

#18) E(0, 1), F(2, 0), G(4, 4), H(2, 5)



Parallelogram Rectangle

$m_{\overline{EF}} = \frac{\Delta y}{\Delta x} = \frac{(1)-(0)}{(0)-(2)} = \frac{1}{-2}$

$m_{\overline{GH}} = \frac{\Delta y}{\Delta x} = \frac{(5)-(4)}{(2)-(4)} = \frac{1}{-2}$ } Parallel

$m_{\overline{EH}} = \frac{\Delta y}{\Delta x} = \frac{(5)-(1)}{(2)-(0)} = \frac{4}{2} = 2$

$m_{\overline{FG}} = \frac{\Delta y}{\Delta x} = \frac{(4)-(0)}{(4)-(2)} = \frac{4}{2} = 2$ } Parallel

Perpendicular

$d_{EH} = \sqrt{[\Delta x]^2 + [\Delta y]^2}$

$= \sqrt{[(0)-(2)]^2 + [(1)-(5)]^2}$

$= \sqrt{[-2]^2 + [-4]^2}$

$= \sqrt{4+16}$

$d_{EH} = \sqrt{20}$

$d_{EH} = 2\sqrt{5}$

$d_{EF} = \sqrt{[\Delta x]^2 + [\Delta y]^2}$

$= \sqrt{[(0)-(2)]^2 + [(1)-(0)]^2}$

$= \sqrt{[-2]^2 + [1]^2}$

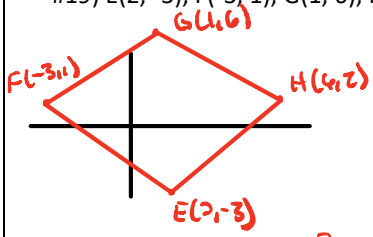
$= \sqrt{4+1}$

$d_{EF} = \sqrt{5}$

not a rhombus

$\therefore$ Parallelogram, Rectangle

#19) E(2, -3), F(-3, 1), G(1, 6), H(6, 2)



Parallelogram? $m_{\overline{FH}} = m_{\overline{GE}}$

$m_{\overline{FH}} = \left(\frac{\Sigma x}{2}, \frac{\Sigma y}{2}\right) = \left(\frac{(-3)+(6)}{2}, \frac{(1)+(2)}{2}\right) = \left(\frac{3}{2}, \frac{3}{2}\right)$

$m_{\overline{EG}} = \left(\frac{\Sigma x}{2}, \frac{\Sigma y}{2}\right) = \left(\frac{(1)+(2)}{2}, \frac{(6)+(-3)}{2}\right)$

$m_{\overline{EG}} = \left(\frac{3}{2}, \frac{3}{2}\right)$

Rhombus? $m_{\overline{FH}} \perp m_{\overline{GE}}$

$m_{\overline{FH}} = \frac{\Delta y}{\Delta x} = \frac{(1)-(2)}{(-3)-6} = \frac{-1}{-9}$

$m_{\overline{FH}} = \frac{1}{9}$

$m_{\overline{GE}} = \frac{\Delta y}{\Delta x} = \frac{(6)-(-3)}{(1)-(2)} = \frac{9}{-1}$

$m_{\overline{GE}} = -9$

Rectangle? $d_{FH} = d_{GE}$

$d_{FH} = \sqrt{[\Delta x]^2 + [\Delta y]^2}$

$= \sqrt{[(-3)-(6)]^2 + [(1)-(2)]^2}$

$= \sqrt{[-9]^2 + [-1]^2}$

$= \sqrt{81+1}$

$d_{FH} = \sqrt{82}$

$d_{GE} = \sqrt{[\Delta x]^2 + [\Delta y]^2}$

$= \sqrt{[(1)-(2)]^2 + [(6)-(-3)]^2}$

$= \sqrt{(-1)^2 + (9)^2}$

$= \sqrt{1+81}$

$d_{GE} = \sqrt{82}$

$\therefore$ Parallelogram, Rhombus, Rectangle, Square.

#1) False, the diagonals of a rhombus are not congruent unless it is a square.
#2) True, the diagonals of a parallelogram bisect each other.
#3) True, the diagonals of a rhombus are perpendicular.
#4) True, since the diagonals of a parallelogram bisect each other, and all four sides of a rhombus are congruent, the triangles are congruent by SSS.
#5) False, the consecutive angles of a rhombus are not congruent unless it is also a square.
#6) True, the consecutive angles in a parallelogram are supplementary.
#7) Rectangle, Square
#8) Parallelogram, Rectangle, Rhombus, Square
#9) Rhombus, Square
#10) Parallelogram, Rectangle, Rhombus, Square
#11) Square #12) $m\angle 1 = 28$, $m\angle 4 = 62$, $m\angle 6 = 90$
#13) 31 #14) 14 #15) 45 #16) 8 #17) -3 and 8
#18) Parallelogram, Rectangle #19) Parallelogram, Rectangle, Rhombus, Square