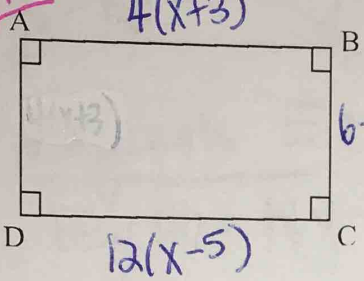
Extra Practice – Parallelograms

Name _____

First identify what shape you are given. Then solve for the variable(s) in each quadrilateral below using the properties of parallelograms, rhombi, rectangles, and squares. Show equation used. You may need to draw in diagonals based on the information given.

1. $AB = 4(x+3)$; $BC = 6-(2+y)$
$DC = 12(x-5)$; $AD = 3y$

Rectangle
90° ∠'s
sides ≅ not ≅

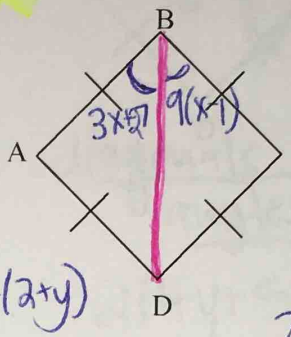


$4(x+3) = 12(x-5)$
$4x+12 = 12x-60$
$72 = 8x$
$x = 9$

$3y = 6-(2+y)$
$3y = 6-2-y$
$4y = 4$
$y = 1$

2. $m\angle ABD = 3x+27$; $m\angle DBC = 9(x-1)$

Rhombus
≅ sides
not 90°



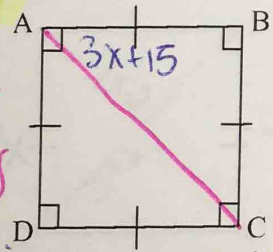
★ diagonals bisect ∠'s

$3x+27 = 9(x-1)$
$3x+27 = 9x-9$
$36 = 6x$
$x = 6$

1. x = 9
y = 1
2. x = 6

3. $m\angle CAB = 3x+15$

Square
90° ∠'s
≅ sides

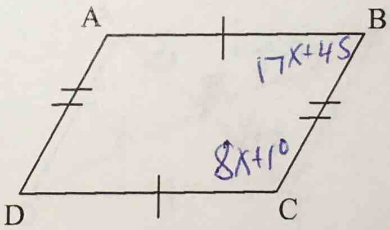


★ diagonals bisect ∠'s
we know ∠ is 90°

$2(3x+15) = 90$
$3x+15 = 45$
$3x = 30$
$x = 10$

4. $m\angle ABC = 17x+45$;
$m\angle BCD = 8x+10$

Parallelogram
opp. sides ≅

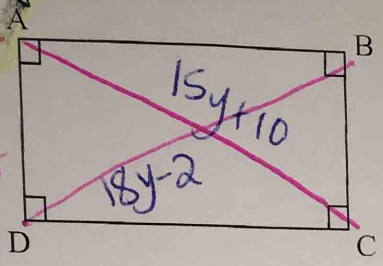


Consecutive ∠'s
comp.:

$8x+10+17x+45 = 180$
$25x+55 = 180$
$25x = 125$
$x = 5$

3. x = 10
4. x = 5

5. $AC = 15y + 10$; $BD = 18y - 2$



Rectangle
90° ∠'s
sides not all ≅

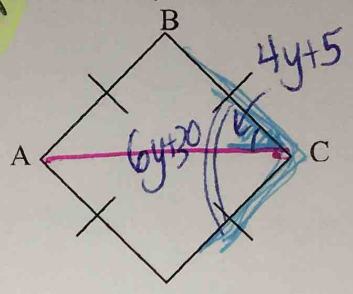
diagonals ≅:

$15y + 10 = 18y - 2$

$12 = 3y$

$y = 4$

6. $m\angle BCA = 4y + 5$; $m\angle BCD = 6y + 30$



Rhombus
all sides ≅
not 90° ∠'s

diagonals bisect angles

$2(4y + 5) = 6y + 30$

$8y + 10 = 6y + 30$

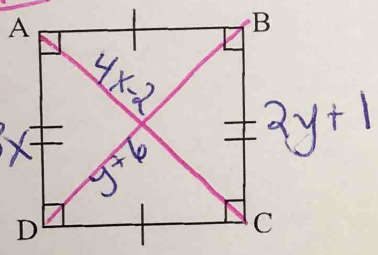
$2y = 20$

$y = 10$

5. y = 4

6. y = 10

7. $AD = 3x$; $BC = 2y + 1$
$AC = 4x - 2$; $DB = y + 6$



Rectangle
90° ∠'s
opp. sides ≅

opp sides ≅:

$3x = 2y + 1$

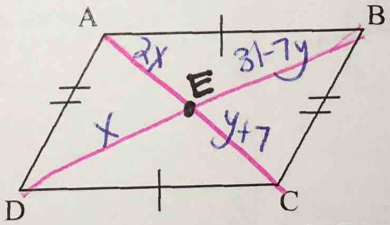
$3x - 2y = 1$ ★

diagonals ≅:

$4x - 2 = y + 6$

$4x - y = 8$ ★

8. Let E be intersection of $\overline{AC}$ and $\overline{DB}$
$AE = 2x$; $EC = y + 7$
$DE = x$; $DB = 31 - 7y$



Parallelogram
opp. sides ≅

$2x = 31 - 7y$

$2x + 7y = 31$ ★

$2y = y + 7$

$2x - y = 7$ ★

7. x = 3

y = 4

8. x = 5

y = 3

$\begin{cases} 3x - 2y = 1 \\ 4x - y = 8 \text{ (mult. -2)} \end{cases}$

$\begin{cases} 3x - 2y = 1 \\ -8x + 2y = -16 \end{cases}$

$-5x = -15$

$x = 3$

$3(3) = 2y + 1$

$9 = 2y + 1$

$8 = 2y$

$y = 4$

$\begin{cases} 2x + 7y = 31 \\ 2x - y = 7 \text{ (mult. -1)} \end{cases}$

$\begin{cases} 2x + 7y = 31 \\ -2x + y = -7 \end{cases}$

$8y = 24$

$y = 3$

$x = 5$