Geometry
Parallelograms

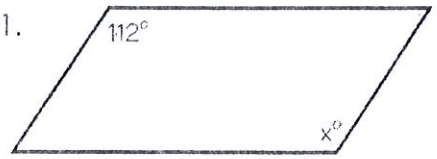
Name: _____
Date: _____

Properties of Parallelograms

1. Opposite angles of a parallelogram are congruent.
2. Opposite sides of a parallelogram are congruent & parallel.
3. Consecutive angles in a parallelogram are supplementary.
4. The diagonals of a parallelogram bisect each other.

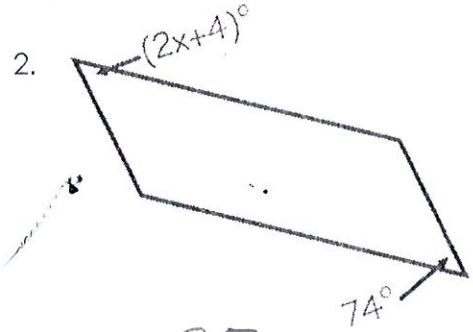
1st Property: opposite angles are congruent

1.



X= 112°

2.



$2x+4=74$
$2x=70$
$x=35$

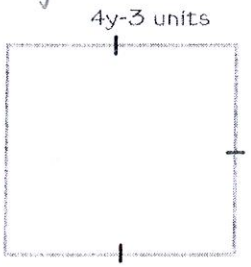
X= 35

2nd Property: opposite sides are congruent

3.

y= 22

4.



$4y-3=y+3$
$3y-3=3$
$3y=6$
$y=2$

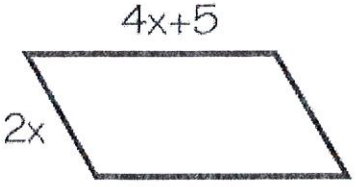
y= 2

5.

X= 6

$6x-7=17+2x$
$4x-7=17$
$4x=24$
$x=6$

6.



$4x+5=2x$
$-4x \quad -4x$

$\frac{5}{-2}=\frac{-2x}{-2}$

$-5/2=x$

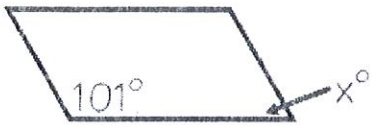
What is wrong with this logic?

$2x \neq 4x+5$ These sides are not opposite.

(180)

3rd Property: Consecutive angles are supplementary

7.



101 + X = 180

X = 79

X= 79°

8.

2X+42 + 10X+18 = 180

12X+60 = 180

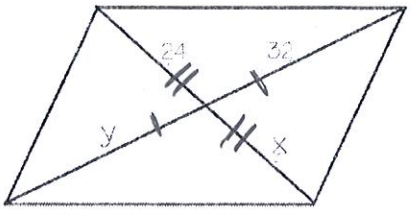
12X = 120

X = 10

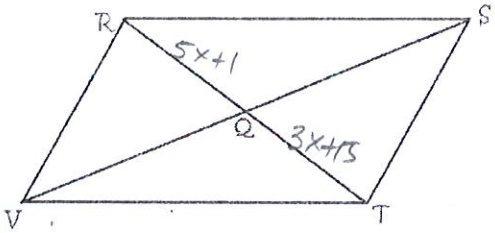
4th Property: Diagonals bisect each other

9. x= 24

y= 32



10. In ▱ RSTV, diagonals RT and VS intersect at Q. If RQ = 5x+1 and QT = 3x+15, find QT.



X= 7

(now plug in x to get QT)

QT= 36

3(7)+15

= 21+15

= 36

5X+1 = 3X+15

2X+1 = 15

2X = 14

X = 7

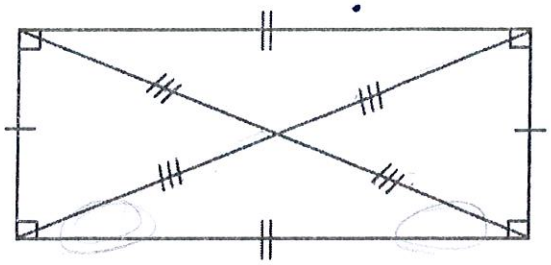
Rectangle Characteristics

Has all the properties of a parallelogram

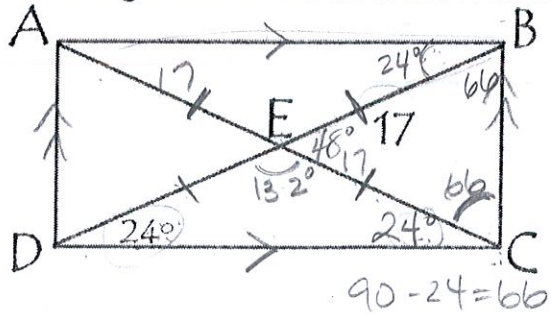
Has 4 right angles

Diagonals are congruent

isosceles triangles



Use rectangle ABCD to answer the following.



90 - 24 = 66

4. m<BCE 66°

5. m<BEC 48°

6. AC 34

7. m<ABD 24°

8. m<CED 132°

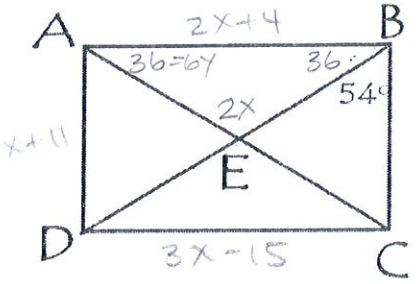
180 - 24 - 24 = 132°

180 - 132 = 48°

Given Rectangle ABCD, solve each problem.

9. If m<AEB = 2x, find x. 54°

$36+36+2x=180$
$72+2x=180$
$2x=108$
$x=54$



10. If m<BAC = 6y, find y. 6

$36=6y$

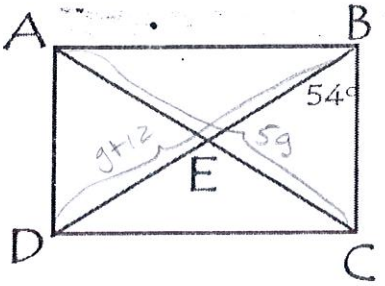
11. If AB = 2x + 4, CD = 3x - 15, and AD = x + 11. Find BC. 30

$2x+4=3x-15$
$4=x-15$
$19=x$

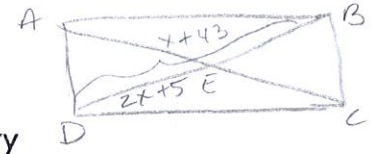
$x+11$
$19+11$
$=30$

12. If AC = 5g and DB = g + 12, solve for g. 3

$5g=g+12$
$4g=12$
$g=3$



13. If DB = x + 43 and DE = 2x + 5, solve for x. 11



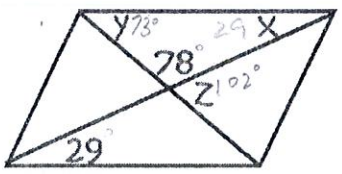
$2(2x+5)=x+43$
$4x+10=x+43$
$3x+10=43$
$3x=33$
$x=11$

Geometry
Homework – Parallelograms

Name_____

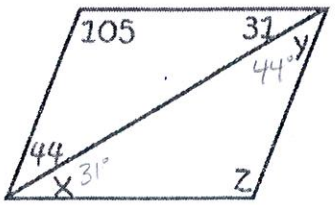
If each of the quadrilaterals is a parallelogram, find the values of x, y, and z.

1.



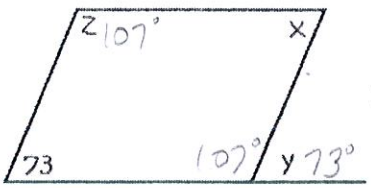
x = 29°
y = 73°
z = 102°

2.



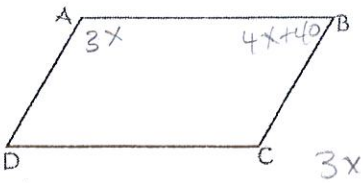
x = 31°
y = 44°
z = 105°

3.



x = 73°
y = 73°
z = 107°

4. Given ▱ ABCD, with m<A = 3x and m<B = 4x+40, find the measure of each angle.



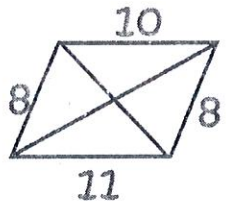
m<A = 60° m<B = 120°
m<C = 60° m<D = 120°

$3x+4x+40=180$
$7x+40=180$
$7x=140$
$x=20$

$3(20)=60$
$4(20)+40$
$=120°$

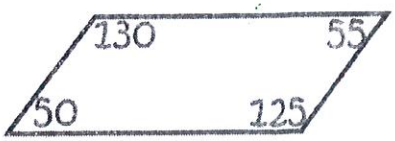
Explain why it is not possible for each figure to be a parallelogram.

5.



opposite sides are not congruent

6.

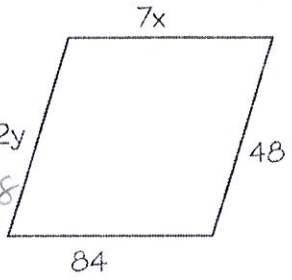


opposite angles are not congruent

In the parallelograms below, solve for each variable.

7. x = 12

y = 4

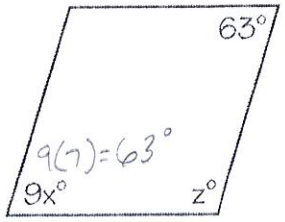


$7x = 84$ $12y = 48$

$x = 12$ $y = 4$

8. x = 7

z = 117°



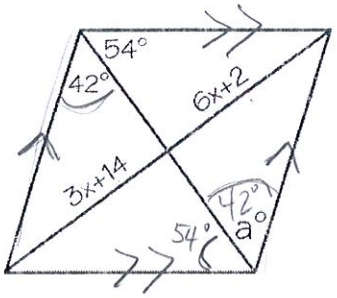
$9x = 63$

$x = 7$

$180 - 63 = 117$

9. a = 42°

x = 4



$3x + 14 = 6x + 2$

$14 = 3x + 2$

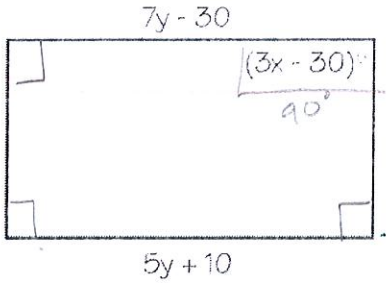
$12 = 3x$

$4 = x$

Given the rectangles below, solve for each variable.

10. x = 40

y = 20



$3x - 30 = 90$

$3x = 120$

$x = 40$

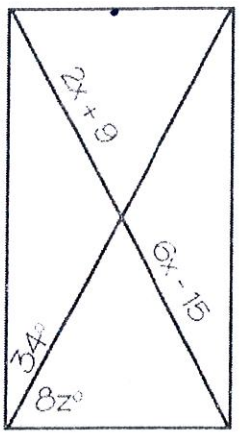
$7y - 30 = 5y + 10$

$2y - 30 = 10$

$2y = 40$ $y = 20$

11. x = 6

z = 7



$2x + 9 = 6x - 15$

$9 = 4x - 15$

$24 = 4x$

$6 = x$

$34 + 8z = 90$

$8z = 56$ $z = 7$

12. **Which information is needed to show that a parallelogram is a rectangle?**

A. The diagonals bisect each other.

B. The diagonals are congruent.

C. The diagonals are congruent and perpendicular.

D. The diagonals bisect each other and are perpendicular.