Name: Key Date: _____ Block: _____

Parallelograms Extra Practice

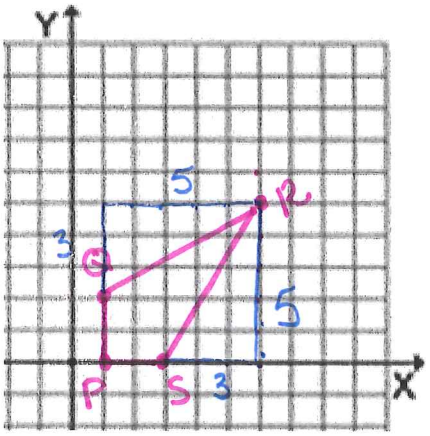
Topic/Assignment	I CAN statement	Turned in?
Properties of Parallelograms	1) I can find the missing angle measurements	Yes No
Properties of Parallelograms	1) I can find angle and side measures in parallelograms.	Yes No
Properties of Parallelograms	1) I can use properties to prove quadrilaterals are parallelograms.	Yes No

Properties of Parallelograms

Objective: **To use relationships to find sides and angles in parallelograms.**

1: Points *P, Q, R,* and *S* are the vertices of a quadrilateral. Determine if the quadrilateral is a parallelogram. Show all work.

a) $P(1,0), Q(1,2), R(6,5), S(3,0)$



Slope $PS = \frac{0}{2} = 0$

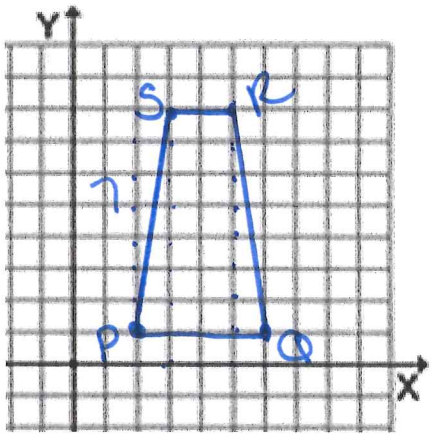
Slope $PQ = \frac{2}{0}$ = undefined

Slope $QR = \frac{3}{5}$

Slope $SR = \frac{5}{3}$

Not a parallelogram because op. sides are not //.

b) $P(2,1), Q(6,1), R(5,8), S(3,8)$



Slope $PQ = \frac{0}{4} = 0$

Slope $SR = \frac{0}{2} = 0$ > //

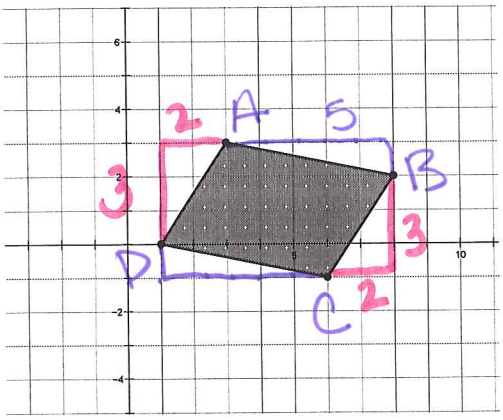
Slope $PS = \frac{7}{1} = 7$

Slope $RQ = -\frac{7}{1} = -7$ > not //

∴ not a parallelogram because only one pair of op. sides are parallel.

C. Determine whether the figure with vertices A(3,3), B(8,2), C(6,-1), D(1,0) is a parallelogram.

To be a parallelogram, you must test for op. sides // (same slopes)



Slope AB = $-\frac{1}{5}$
Slope DC = $-\frac{1}{5}$ > AB // DC

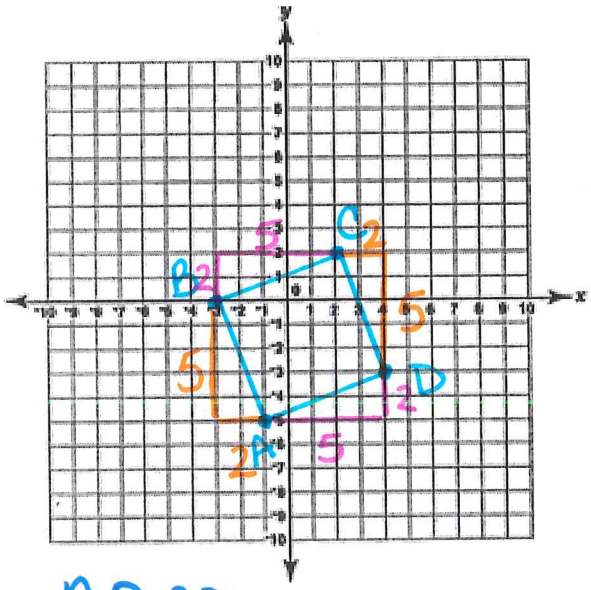
Slope DA = $\frac{3}{2}$
Slope CB = $\frac{3}{2}$ > DA // CB

ABCD is a parallelogram because op. sides have the SAME Slope!

D. Determine whether the figure below is a parallelogram.

To be a parallelogram, you must test for op. sides // (same slope)

$A(-1, -5), B(-3, 0), C(2, 2), D(4, -3)$



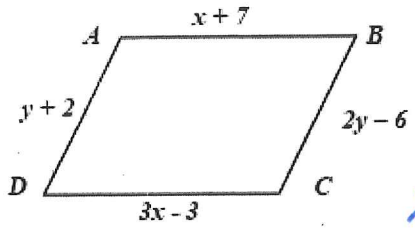
Slope AB = $-\frac{5}{2}$
Slope CD = $-\frac{5}{2}$ > AB // CD

Slope BC = $\frac{2}{5}$
slope AD = $\frac{2}{5}$ > BC // AD

ABCD is a parallelogram because op. sides have the same slope!

Name: _____ Date: _____ Block: _____

2. ABCD is a parallelogram. Find x, y and the perimeter. Show your geometry and justifications for all steps.



Find x

AB = DC opp. sides of a para are ≅

x + 7 = 3x - 3

7 = 2x - 3

10 = 2x

5 = x

same Find y

BC = AD

2y - 6 = y + 2

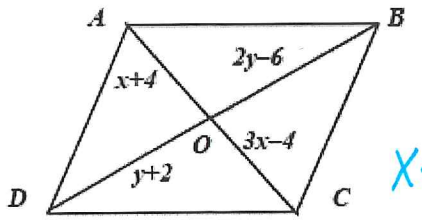
y - 6 = 2

y = 8

Perimeter = 5 + 7 + 2(8) - 6 + 3(5) - 3 + 8 + 2

Perimeter = 44 units

3. ABCD is a parallelogram. Find x, y, BD and AC. Show your geometry and justifications for all steps.



Find x

AO ≅ OC diags of a para bisect each other

x + 4 = 3x - 4

4 = 2x - 4

8 = 2x

4 = x

Find y

DO ≅ BO diags of a Para bisect each other

y + 2 = 2y - 6

2 = y - 6

8 = y

8 = y

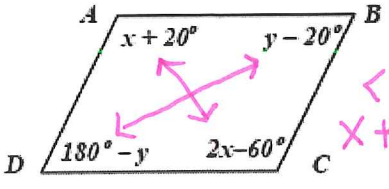
BD = 8 + 2 + 2(8) - 6

BD = 20 units

AC = 4 + 4 + 3(4) - 4

AC = 16 units

4. ABCD is a parallelogram. Find x, y and <C. Show your geometry and justifications for all steps.



Find x

op. <s of a para are ≅

<A = <C

x + 20 = 2x - 60

20 = x - 60

80° = x

Find y

op. <s of a Parallelogram are ≅

<B ≅ <D

y - 20 = 180 - y

2y - 20 = 180

2y = 200

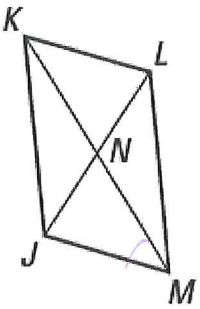
y = 100

<C = 2(100) - 60

<C = 140°

Name: _____ Date: _____ Block: _____

5. Complete the statement and justify your reasoning.



a. JK = LM because op. sides of a para are ≅

b. MN = NK because diags of a para bisect each other

c. <MLK= <KJM because op. <s of a para are ≅

d. <JKL= <LMJ because op. <s of a Para are ≅

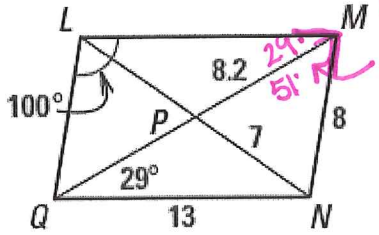
e. JN= LN because diags of a para bisect each other

f. KL= JM because op. sides of a para are ≅

g. <MNL= <KNJ because vertical <s are ≅

h. <MKL = <KMJ because // lines form ≅ alt. int <s.

6. **LMNQ is a parallelogram. Find the measures and explain your reasoning.**



180-100-29

a. LM= 13
because:
LM=QN
op. sides of a Para. are ≅

b. LP= 7
because:
diags of a para bisect each other

c. LQ= 8
because:
op. sides of a Para are ≅

d. QP = 8.2
because:
diags of a Para bisect each other.

e. <LMN = 80°
because: 29+51°
con. int. <s of Paras are suppl.

f. <NQL = 80°
because:
con. int. <s of a para are Suppl.

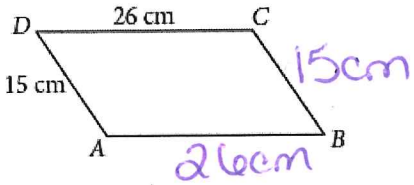
g. <MNQ = 100°
because:
op. <s of a Para are ≅

h. <LMQ = 29°
because:
// lines form ≅ alt int. <s.

Name: Key Date: _____ Block: _____

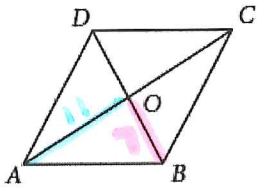
Directions: ABCD is a parallelogram. Show your geometry and what property or properties you used to help you answer the question.

7. Perimeter $ABCD$ = 82cm



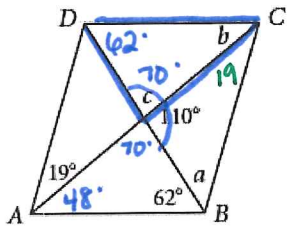
AD = CB op. sides
CD = AB of a para
are ≅

8. $AO = 11$, and $BO = 7$.
AC = 22, BD = 14



AC = 2·AO
BD = 2·OB
diags of a Para bisect each other

9. a = 51°, b = 48°,
c = 70°

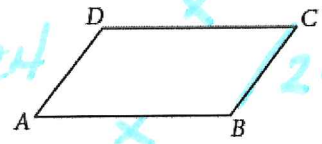


Find c: c = 70°
linear pairs are suppl.

Find b: b = 48°
// lines form ≅ alt. int. ∠s AND Δ sum.

Find a a = 51°
// lines form ≅ alt. int. ∠s and Δ sum.

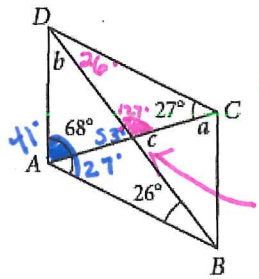
10. Perimeter $ABCD$ = 119, and
BC = 24. AB = _____



P = 24 + x + 24 + x
CLT
P = 2x + 48
119 = 2x + 48
71 = 2x
AB = 35.5

op. sides of a Para are ≅
AD = CB
DC = AB

11. a = 41°, b = 86°,
c = 53°

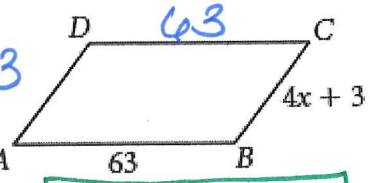


Find a
// lines form ≅ alt int ∠s.
a = 41°

Find c: linear pairs are suppl.
127 + c = 180
c = 53°

Find b
Δ sum.
b = 86°

12. Perimeter ABCD = 16x - 12. Find AD.



4x+3

P = 4x+3+63+4x+3+63

16x - 12 = 8x + 132
-8x -8x
8x - 12 = 132
8x = 144
x = 18

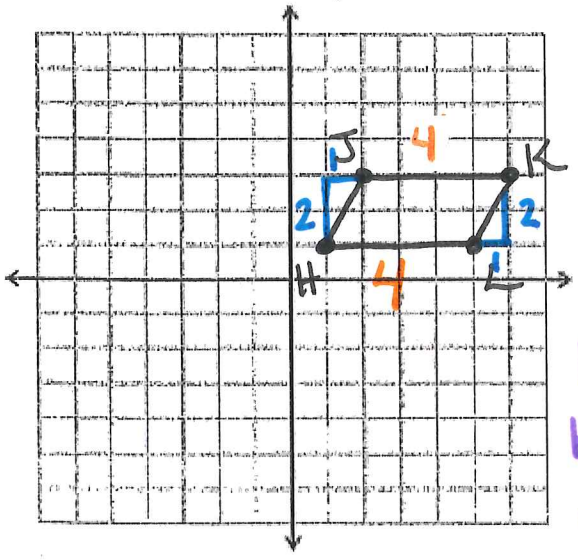
AD = 75

AD = 4(18) + 3

Determine whether the figure below is a parallelogram.

To be a parallelogram, you must test for op. sides // (same slope)

13. $H(1, 1), J(2, 3), K(6, 3), L(5, 1)$



slope JK = $\frac{0}{4}$ = 0
slope HL = $\frac{0}{4}$ = 0
> JK // HL

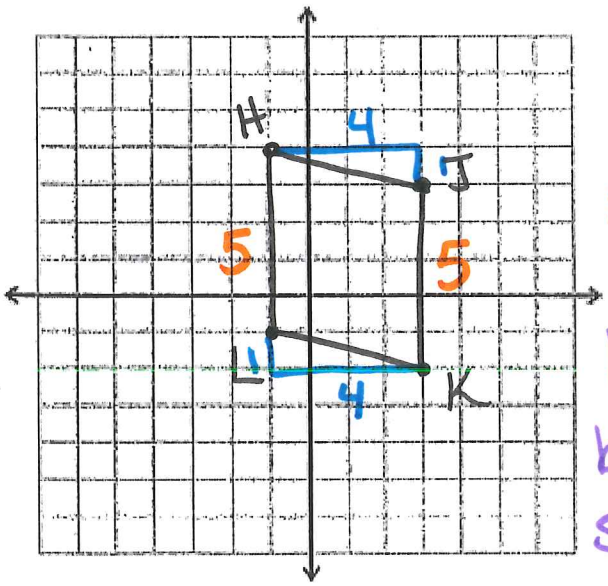
slope HJ = $\frac{2}{1}$ = 2
slope KL = $\frac{2}{1}$ = 2
> HJ // KL

HJKL is a parallelogram because op. sides have the same slope.

Determine whether the figure below is a parallelogram.

To be a parallelogram, you must test for op. sides // (same slope)

14. $H(-1, 4), J(3, 3), K(3, -2), L(-1, -1)$



slope HL = $\frac{5}{0}$ = undefined
slope JK = $\frac{5}{0}$ = undefined
> HL // JK

slope HJ = $\frac{1}{4}$
slope LK = $\frac{1}{4}$
> HJ // LK

HJLK is a parallelogram because op. sides have the same slope.