**Pre-AP Geometry**

**Unit 11: Quadrilaterals**

**Tentative Schedule**

|  |  |  |
| --- | --- | --- |
| Day/Date | Topic | Practice |
| Monday, Feb. 4 | Properties of Quadrilaterals;6.2 Properties of Parallelograms | Pages 2-3 (HW) |
| Tuesday, Feb. 5 | 6.3 Proving Parallelograms | Page 4 (CW)Pages 5-6 (HW) |
| Wednesday, Feb. 6 | **Quiz: 6.2 & 6.3** |  |
| Thursday, Feb. 7 | 6.4: Rectangles, Rhombi, Squares | Pages 7-9 (CW)Pages 10-12 (HW) |
| Friday, Feb. 8 | 6.5: Trapezoids | Pages 13-14 (CW)Pages 15-16 (HW) |
| Monday, Feb. 11 | 6.5: Kites | Page 17-20 (CW/HW) |
| Tuesday, Feb. 12 | **Quiz: Rectangles, Rhombi, Squares, Trapezoids** | Page 21-22 (CW/HW) |
| Wednesday, Feb. 13 | Misc. Quads.; Connecting Midpoints | Page 23 (CW)Pages 24-28 (HW: begin review) |
| Thursday, Feb. 14 | Review | Pages 24-28 (HW: Complete review) |
| Friday, Feb. 15 | **Unit 11Test: Quadrilaterals** | REST! Enjoy the long weekend! |

Geometry Worksheet Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Properties of Parallelograms Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_\_

(1-8) Given parallelogram TAXI, solve for x, y, and/or z. Also, state what property of the parallelogram that you are using (example: opposite sides are congruent)

I

M

T

X

A

|  |
| --- |
| 1. AX = 3y; TI = 2y + 10IMTXA |
| 2. mTAX = 2y – 5; mTIX = 3y – 20IMTXA |
| 3. AM = 2x2 + 2x - 15; IM = x2 + 10x + 5IMTXA |
| 4. mXTI = 4y – 5; mTXA = 3y + 10IMTXA |
| 5. TM = 3z; TX = 3z + 18 |
| 6. MI = 6y – 5; AI = 2y + 15IMTXA |
| 7. AT = 7y + z; XI = y + 28; TI = y + z; AX = 5IMTXA |
| 8. mTIX = 2z + y; mTAX = z + 20; mATI = z – yIMTXA |
| In problems 9-12, find x and y so the KMNO is a parallelogram. |
| 9. KM = x + y; MN = 2y + 6; ON = 2x – y; KO = 3yKPMNOKPMNO |
| 10. KM = x + y; ON = 3x – 4y; mMKN = x + 5; mKNO = 2x – 10 |
| 11. mKOM = 6y + 1; mKMO = 3x + 2; mMON = 2x + 8; mOMN = 4y + 7KPMNO |
| 12. KP = 2x + 4; MP = 6 + 3y; NP = 15 – y; OP = x + 4KPMNO |

6-3 Notes: Proving that a Quadrilateral is a Parallelogram

You can show that a quadrilateral is a parallelogram if you can show that one of the following is true.

 Def: Both pairs opp. Sides  Parallelogram

* Both pairs of opp. Sides ≅ → Parallelogram
* Diagonals bisect each other → Parallelogram
* Both pairs opp. Angles ≅ → Parallelogram
* One pair of opp. Sides are both  and ≅ → Parallelogram

Determine if each quadrilateral is a parallelogram. Justify your answer.

70°

110°

40°

40°

30°

30°

1. 2. 3.

Determine whether quadrilateral ABCD with the given vertices is a parallelogram. Explain.

4. A(2,5), B(5,9), C(6,3), D(3,-1)

5. A(-1,6), B(2,-3), C(5,0), D(2,9)

Geometry Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Worksheet – 6.3 Parallelograms Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_

Are the following parallelograms? If yes, why? (use one of the five reasons from section 6.3) If no, tell what else would be needed.

|  |  |  |
| --- | --- | --- |
| 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_3553 | 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_7777 |
| 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_120˚60˚70˚110˚ | 5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_100˚80˚88 | 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_171730˚30˚ |
| 10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_110˚70˚110˚70˚ | 11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_9955 | 12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_MDCABM is the midpoint of  and  |
| 13. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 14. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_130˚50˚50˚ | 15. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_25˚25˚1919 |

State whether the given information is sufficient to support the statement, “Quadrilateral ABCD is a parallelogram.” If the information is sufficient, state the reason.

**A**

**O**

**D**

**C**

**B**

**1**

**2**

**4**

**3**

16.  and 

17. AO = OC and BO = OD

18.  and 

19.  and AO = OC

20.  and 

21.  and 

22.  and 

23. and 

24.  and 

25.  and 

26.  and 

27.  and 

28.  and 

29.  and 

30.  is supplementary to 
  is supplementary to 

***Classifying Quadrilaterals***

**QUADRILATERALS**

****

**What’s your favorite type of Quadrilateral??**

**The kind with four sides!**

6-4 Study Guide – Special Parallelograms: Rectangles, Squares and Rhombi

A **rectangle** is a quadrilateral with four right angles. It follows that since both pairs of opposite angles are congruent; a rectangle is a special type of parallelogram. Thus, a rectangle has all the properties of a parallelogram. However, a rectangle has an additional property:

* Rectangle → diagonals are congruent

A **rhombus** is a quadrilateral with four congruent sides. Since opposite sides of a rhombus are congruent, a rhombus is a parallelogram and has all the properties of a parallelogram. The diagonals of a rhombus have two special relationships.

* Rhombus → diagonals are perpendicular
* Rhombus → each diagonal bisects two angles of the rhombus

Is the parallelogram a rhombus or a rectangle? You must first determine that the quadrilateral is a parallelogram and then you can use one of the following theorems to determine if it is also a rhombus or a rectangle.

* Consecutive sides of a parallelogram are congruent → rhombus
* One diagonal of a parallelogram bisects two angles → rhombus
* Diagonals of a parallelogram are perpendicular → rhombus
* Diagonals of a parallelogram are congruent → rectangle
* Adjacent sides of parallelogram are perpendicular → rectangle

A **square** is a quadrilateral with four right angles (a rectangle) and four congruent sides (a rhombus). Therefore, it has all the properties of a parallelogram, a rectangle, and a rhombus. Also, to show that a quadrilateral is a square, you need to show that it is a parallelogram, a rhombus, and a rectangle.

D

C

A

B

Example: ABCD is a rhombus. If mADB = 27, find mADC.

Since each diagonal of a rhombus bisects a pair of opposite
angles, mADC = 2(ADB). So mADC = 2(27) or 54.

S

T

P

Q

R

Use rhombus PQRS and the given information to find each value.

1. If SQ = 24, RP = 10, find SR.
2. If mPRS = 17, find mQRS.
3. Find mSTR.
4. If SP = 4x – 3 and PQ = 18 + x, find the value of x.

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

A

T

C

E

R

1. mRCT = 30°, find mETC.
2. If RC = 5x + 2 and AE = x + 14, find the value of x.
3. If mEAC = 40°, find mAEC.

Determine whether EFGH is a parallelogram, a rectangle, a rhombus, or a square for each set of vertices. State yes or no for each and explain why or why not. Show work to support the explanations.

8. M(1, 5), N(6, 5), O(6, 10), P(1, 10) 9. W(5, 4), X(3, -6), Y(0, -10), Z(2, 0)

 parallelogram: parallelogram:

 rectangle: rectangle:

 rhombus: rhombus:

 square: square:

-----------------------------------------------------------------------------------------------------------------------

10. D(1, 10), E(-4, 0), F(7, 2), G(12, 12) 11. R(5, 6), E(7, 5), S(9, 9), T(7, 10)

parallelogram: parallelogram:

 rectangle: rectangle:

 rhombus: rhombus:

 square: square:

Geometry Worksheet Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Rectangles, Squares & Rhombi (6.4) Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_

|  |
| --- |
| 1. In rectangle ABCD, AB = 2x + 3y, BC = 5x – 2y, CD = 22, and AD = 17. Find x and y.EADBC |
| In the diagram for problems 2-7,QRST is a rectangle and QZRC is a parallelogram. |
| 2. If QC = 2x + 1 and TC = 3x – 1, find x.RZCSTQRZCSTQ | 3. If mTQC = 70, find mQZR.RZCSTQ |
| 4. If mRCS = 35, find mRTS. | 5. If mQRT = mTRS, find mTCQ.RZCSTQ |
| 6. If RT = x2 and QC = 4x – 6, what is the value of x?RZCSTQ | 7. RZ = 6x, ZQ = 3x + 2y, and CS = 14 – x. Find the values of x and y. Is QZRC a “special” parallelogram? If so, what kind?RZCSTQ |
| Use rectangle STUV for questions 8-11.STUVK761234588. If m1 = 30, m2 = \_\_\_\_\_\_\_9. If m6 = 57, m4 = \_\_\_\_\_\_\_10. If m8 = 133, m2 = \_\_\_\_\_\_\_11. If m5 = 16, m3 = \_\_\_\_\_\_\_ |
| 12. ABCD is a rhombus. If the perimeter of ABCD = 68 and BD = 16, find AC.ADCB | 13. ABCD is a square. If mDBC = x2 – 4x, find x.ABCD |
| Use rhombus ABCD for problems 14-19ABCDF14. If mBAF = 28, mACD = \_\_\_\_\_\_.15. If mAFB = 16x + 6, x = \_\_\_\_\_\_\_.16. If mACD = 34, mABC = \_\_\_\_\_\_\_.17. If mBFC = 120 – 4x, x = \_\_\_\_\_\_.18. If mBAC = 4x + 6 and mACD = 12x – 18, x = \_\_\_\_\_\_.19. If mDCB = x2 – 6 and mDAC = 5x + 9, x = \_\_\_\_\_\_ |
| 20. ABCD is a square. AB = 5x + 2y, AD = 3x – y, and BC = 11. Find x and y.ABCD | 21. A contractor is measuring for the foundation of a building that is to be 85 ft by 40 ft. Stakes and string are placed as shown. The outside corners of the building will be at the points where the strings cross. He then measures and finds WY = 93 ft and XZ = 94 ft. Is WXYZ a rectangle? If not, which way should stakes E and F be moved to made WXYZ a rectangle?ZHABCYDXWEFG85 ft40 ft |
| 22. ABCD is a rectangle. Find the length of each diagonal if AC = 2(x – 3) and BD = x + 5. | 23. ABCD is a rectangle. Find each diagonal if  and BD = 4 – c. |
| Given rectangle QRSTXRQST\_\_\_\_\_\_\_\_24. If , find mTXS.\_\_\_\_\_\_\_\_25. If mRQS = 30° and QS = 13, find SR.\_\_\_\_\_\_\_\_26. If mQST = 45° and QT = 6.2, find QR. |
| 27. Given rhombus ABCD, AB = 5x + y – 1, BC = 18, CD = 8x – 2y + 2. Find x and y.DCBAE | 28. Given square PQRS, SR = x2 – 2x, QR = 4x – 5. Find x, SR, and QR.PQRTS |

Determine whether WXYZ is a parallelogram, a rectangle, a rhombus, or a square for each set of vertices. State yes or no for each and explain why or why not. Show work to support the explanations. For example, if you say the sides are parallel then you need to calculate the slopes.

29. W(5, 6), X(7, 5), Y(9, 9), Z(7, 10)

 Parallelogram:

 Rectangle:

 Rhombus:

 Square:

30. W(-3, -3), X(1, -6), Y(5, -3), Z(1, 0)

 Parallelogram:

 Rectangle:

 Rhombus:

 Square:

Determine whether EFGH is a parallelogram, a rectangle, a rhombus, or a square for each set of vertices. State yes or no for each and explain why or why not. Show work to support the explanations. For example, if you say the sides are parallel then you need to calculate the slopes.

31. E(0, -3), F(-3, 0), G(0, 3), H(3, 0)

 Parallelogram:

 Rectangle:

 Rhombus:

 Square:

32. E(2, 1), F(3, 4), G(7, 2), H(6, -1)

 Parallelogram:

 Rectangle:

 Rhombus:

 Square:

**Trapezoid Study Guide**

H

G

F

E

Base

Base

Leg

Leg

A trapezoid is a quadrilateral with exactly one pair of parallel sides. The parallel sides are called **bases** and the nonparallel sides are called **legs**.

An isosceles trapezoid is a trapezoid whose legs are congruent.

median

* The diagonals of an isosceles trapezoid are congruent.

The **median** of a trapezoid is the segment that joins the midpoints of the legs. The median is parallel to the bases and its measure is half the sum of the measures of the bases.

ABCD is an isosceles trapezoid.  is a median.

M

D

C

B

A

N

1

2

Ex. 1 AB = 30, CD = 42, MN = \_\_\_\_\_\_\_\_

Ex. 2 AB = 18, MN = 25, CD = \_\_\_\_\_\_\_\_

Ex. 3 AB = 6x – 3; MN = 15; CD = 8x + 5. Find x, AB, and CD.

Ex. 4 m1 = 4x – 60; mC = 30 – x. Find x, m1, and mC.

Ex. 5 mB = 4x + 40, mD = 3x. Find x, mB, and mD.

Ex. 6  is the median of a trapezoid that bases  and  with C on  and D on . If the vertices of the trapezoid are A(3, 7), B(5, 7), E(11, 1), and F(1,1), find the coordinates of C and D.

y

x

Ex. 7 Given: Isosceles trapezoid ABCD, mABD = 20°, mDAC = 75°. (Note that an isosceles trapezoid has a line of symmetry.)

B

C

D

A

1

2

3

4

5

6

7

8

m1 = \_\_\_\_\_\_

m2 = \_\_\_\_\_\_

m3 = \_\_\_\_\_\_

m4 = \_\_\_\_\_\_

m5 = \_\_\_\_\_\_

m6 = \_\_\_\_\_\_

m7 = \_\_\_\_\_\_

m8 = \_\_\_\_\_\_

mDAB = \_\_\_\_\_\_

mABC = \_\_\_\_\_\_

mADC = \_\_\_\_\_\_

mBCD = \_\_\_\_\_\_

Geometry Worksheet Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Trapezoids (6.5) Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_

2

1

3

4

5

6

7

8

C

D

A

BA

1. Given: Isosceles trapezoid ABCD, mBAC = 30° and mDBC = 85°

m1=\_\_\_\_\_\_\_ m5=\_\_\_\_\_\_\_ m ADC =\_\_\_\_\_\_\_

m2=\_\_\_\_\_\_\_ m6=\_\_\_\_\_\_\_ m BCD =\_\_\_\_\_\_\_

m3=\_\_\_\_\_\_\_ m7=\_\_\_\_\_\_\_ m DAB =\_\_\_\_\_\_\_

m4 =\_\_\_\_\_\_\_ m8 =\_\_\_\_\_\_\_ mCBA=\_\_\_\_\_\_\_

2. Given: Isosceles trapezoid JXVI, mJVI = 42° and mIJV = 65°

6

4

3

5

8

9

2

V

I

J

XA

1

10

11

12

7

m1=\_\_\_\_\_\_\_ m6=\_\_\_\_\_\_\_ m11=\_\_\_\_\_\_\_

m2=\_\_\_\_\_\_\_ m7=\_\_\_\_\_\_\_ m12=\_\_\_\_\_\_\_

m3=\_\_\_\_\_\_\_ m8=\_\_\_\_\_\_\_ m JIV =\_\_\_\_\_\_\_

m4=\_\_\_\_\_\_\_ m9=\_\_\_\_\_\_\_ mIJX=\_\_\_\_\_\_\_\_\_\_

m5 =\_\_\_\_\_\_\_\_ m10=\_\_\_\_\_\_\_

3. Given: Isosceles trapezoid JXVI, mIXV = 83° and mVJX = 28°

6

4

3

5

8

9

2

V

I

J

XA

1

10

11

12

7

m1=\_\_\_\_\_\_\_ m6=\_\_\_\_\_\_\_ m11=\_\_\_\_\_\_\_

m2=\_\_\_\_\_\_\_ m7=\_\_\_\_\_\_\_ m12=\_\_\_\_\_\_\_

m3=\_\_\_\_\_\_\_ m8=\_\_\_\_\_\_\_ m IVX =\_\_\_\_\_\_\_

m4=\_\_\_\_\_\_\_ m9=\_\_\_\_\_\_\_ mVXJ=\_\_\_\_\_\_\_\_\_\_

m5 =\_\_\_\_\_\_\_\_ m10=\_\_\_\_\_\_\_

4.  is the median of a trapezoid that has bases  and , with V on  and W on . If the vertices of the trapezoid are M(2, 6), N(4, 6), P(10, 0), and O(0, 0), find the coordinates of V and W.

5.  is the median of a trapezoid MNPO that has bases  and , with V on  and W on . If M(5, 10), N(9, 10), V(3, 7), and W(11, 7), find the coordinates of P and O.

 is the median of trapezoid QRST in problems 6-11.

|  |  |  |
| --- | --- | --- |
| 6. XY=18 and TS = 7.Find QR.QXTSYR | 7. TS = n and QR = 6. Find XY in terms of n.QXTSYR | 8. XY=16. Find TS+QR.QXTSYR |
| 9. TX = ½ (SR) and mT=130.Find mR.QXTSYR | 10. ST = a and QR = 2b. Find XY.QXTSYR | 11. QX=SY and mTXY = 45.Find mR.QXTSYR |

In problems 12-14, trapezoid ABCD is isosceles. Find the variable in each.

|  |  |  |
| --- | --- | --- |
| 12. AB = x+5 and CD = 3x + 3CDBA | 13. mABC=3x–7 and mADC=5x+3CDBA | 14. AC = x2 + 6 and BD = 8x – 9.CDBA |

Kite – Quadrilateral with two pairs of adjacent sides congruent and no opposite sides congruent.

Properties of a kite:

1. diagonals are perpendicular ()
2. only one diagonal is bisected (E is midpoint of  but not of )
3. 2 sets of consecutive sides congruent ()
4. Angles at ends of non-bisected diagonal are bisected ()
5. Angles at ends of bisected diagonal are congruent ()

Note that a kite has a line of symmetry. The diagonal that is not bisected is the line of symmetry. In this example,  is the line of symmetry.

E

2

1

A

D

C

B

4

3

Geometry Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Worksheet – Kites Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_\_\_\_\_\_

M

W

A

W

A

O

R

2

1

6

5

3

4

7

8

9

10

11

12

1. Given: AROW is a kite Find: m2 = \_\_\_\_\_\_\_

 m1 = 40° m3 = \_\_\_\_\_\_\_

 m10 = 30° m4 = \_\_\_\_\_\_\_

 AO = 10 m5 = \_\_\_\_\_\_\_

 m6 = \_\_\_\_\_\_\_

 m7 = \_\_\_\_\_\_\_

 m8 = \_\_\_\_\_\_\_

 m9 = \_\_\_\_\_\_\_

 m11 = \_\_\_\_\_\_\_

 m12 = \_\_\_\_\_\_\_

 MO = \_\_\_\_\_\_\_

6x-1

5x-3

4x+4

5x-8

8x-1

5x

2. Find x. 3. Find x

 x = \_\_\_\_\_\_\_ x = \_\_\_\_\_\_\_\_

3

G

K

F

H

J



y

2y-20

3x+5

4x-30

4. Kite FGHJ 5. x = \_\_\_\_\_\_\_

 KF = \_\_\_\_\_\_\_ y = \_\_\_\_\_\_\_

 KJ = \_\_\_\_\_\_\_

T

U

A

S

10

17

I

6. AS = 16

 UI = \_\_\_\_\_\_\_

 IT = \_\_\_\_\_\_\_

 UT = \_\_\_\_\_\_\_

7. The perimeter of a kite is 66 cm. The length of one of its sides is 3 cm. less than twice the length of another. Find the length of each side of the kite.

Graph and label each quadrilateral with the given vertices. Then determine the most precise name for each quadrilateral. Explain why you chose the name you did. Show work to support the explanations.

y

x

8. A(3,5), B(7,6), C(6,2), D(2,1)

y

x

9. W(-1,1), X(0,2), Y(1,1), Z(0,-2)

y

x

10. J(2,1), K(5,4), L(7,2), M(2,-3)

y

x

11. R(-2,-3), S(4,0), T(3,2), V(-3,-1)

y

x

12. N(-6,-4), P(-3,1), Q(0,2), R(-3,5)

13. E(-3,1), F(-7,-3), G(6,-3), H(2,1)

y

x

6

6

-7

-7

y

x

14. S(-4,-1), T(-1,5), U(5,2), V(2,-4)

15. K(-3,0), I(0,2), and T(3,0) are the vertices of a kite. Which point could be the fourth vertex?
A. E(0,2) B. E(0,0) C. E(0,-2) D. E(0,-10)

y

x

●

●

●

**C**

**A**

**B**

Given points A, B, and C in the coordinate plane as shown, find the fourth point described below.

16. point D so that ABCD is a parallelogram.

17. point E so that ABEC is a parallelogram.

18. point F so that AFBC is a parallelogram.

y

x

19. The diagonals of quadrilateral EFGH intersect at D(-1,4). Two vertices of EFGH are E(2,7) and F(-3,5). What must be the coordinates of G and H to ensure that EFGH is a parallelogram?

**QUADRILATERAL RELATIONSHIPS**

Use these words in this diagram.

(6)

(2)

(1)

(4)

(3)

(7)

(5)

(8)

Isosceles trapezoids

Kites

Parallelograms

Quadrilaterals

Rectangles

Rhombuses

Squares

Trapezoids

Tell whether the statement is true *always*, *sometimes*, or *never*. If your answer is *sometimes* or *never*, provide a sketch of a situation in which the statement is *not* true.

1. \_\_\_\_\_\_\_\_\_\_Each diagonal of a square divides the square into two isosceles triangles.
2. \_\_\_\_\_\_\_\_\_\_Each diagonal of a rectangle divides the rectangle into two isosceles triangles.
3. \_\_\_\_\_\_\_\_\_\_If two congruent isosceles triangles have a common side, then their other sides from a rhombus.
4. \_\_\_\_\_\_\_\_\_\_If two congruent equilateral triangles have a common side, then their other sides form a rhombus.
5. \_\_\_\_\_\_\_\_\_\_Each diagonal of a rhombus divides the rhombus into two isosceles triangles.
6. \_\_\_\_\_\_\_\_\_\_If two right triangles have a common hypotenuse, then their legs form a rectangle.
7. \_\_\_\_\_\_\_\_\_\_If the diagonals of a quadrilateral are congruent, then the quadrilateral is a rectangle.
8. \_\_\_\_\_\_\_\_\_\_If the diagonals of a quadrilateral are perpendicular, then the quadrilateral is a rhombus.
9. \_\_\_\_\_\_\_\_\_\_If each diagonal of a quadrilateral bisects a pair of opposite angles, then the quadrilateral is a rhombus.

Answer true or false.

* 1. \_\_\_\_\_\_\_ All squares are rhombi.
	2. \_\_\_\_\_\_\_ All rhombi are squares.
	3. \_\_\_\_\_\_\_ All squares are rectangles.
	4. \_\_\_\_\_\_\_ All rectangles are squares.
	5. \_\_\_\_\_\_\_ Some rectangles are squares.
	6. \_\_\_\_\_\_\_ All trapezoids are parallelograms.
	7. \_\_\_\_\_\_\_ All quadrilaterals are trapezoids.
	8. \_\_\_\_\_\_\_ All parallelograms are trapezoids.
	9. \_\_\_\_\_\_\_ All squares are trapezoids.
	10. \_\_\_\_\_\_\_ All quadrilaterals are parallelograms.
	11. \_\_\_\_\_\_\_ Any rhombus with one right angle is a square.
	12. \_\_\_\_\_\_\_ All rectangles are parallelograms.
	13. \_\_\_\_\_\_\_ Every rhombus is a trapezoid.
	14. \_\_\_\_\_\_\_ No trapezoids has a pair of congruent sides.
	15. \_\_\_\_\_\_\_ A parallelogram with four right angles is a square.
	16. \_\_\_\_\_\_\_ A parallelogram with adjacent sides of equal measure is called a rhombus.
	17. \_\_\_\_\_\_\_ Opposite sides of all quadrilaterals are equal in length.
	18. \_\_\_\_\_\_\_ Every parallelogram is a quadrilateral.
	19. \_\_\_\_\_\_\_ Some parallelograms are not squares.
	20. \_\_\_\_\_\_\_ Every square is a trapezoid.
	21. \_\_\_\_\_\_\_ Some quadrilaterals are neither trapezoids nor parallelograms.
	22. \_\_\_\_\_\_\_ No trapezoids are rectangles.
	23. \_\_\_\_\_\_\_ Some rectangles are rhombuses.

Geometry Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Worksheet – Connecting Midpoints Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_\_\_

a

4

5

4

6

3

3

b

c

1. Only one of the lengths a, b, or c can be found. Name the segment and find its length.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. The figure formed by connecting successive midpoints of a rectangle with sides of length 6 and 8 is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with sides of length \_\_\_\_\_\_\_\_\_\_\_\_\_.

E

A

D

C

B

7

2

4

3

5

6

1

3. Given: D is the midpoint of 

 E is the midpoint of 

 mABC = 20˚

 mACB = 120˚

 BC = 7

 Find: m1 = \_\_\_\_\_\_\_\_ m5 = \_\_\_\_\_\_\_\_ m2 = \_\_\_\_\_\_\_\_ m6 = \_\_\_\_\_\_\_\_

 m3 = \_\_\_\_\_\_\_\_ m7 = \_\_\_\_\_\_\_\_ m4 = \_\_\_\_\_\_\_\_ DE = \_\_\_\_\_\_\_\_

4. Given: KITE is a kite.

 M, N, O, P are midpoints

**K**

**E**

**T**

**I**

**O**

**P**

**M**

**N**

8

6

5

4

2

1

13

10

9

11

12

15

16

7

3

14

 mKMN = 50˚

 mKIT = 105˚

 Find: m1 = \_\_\_\_\_\_\_\_ m9 = \_\_\_\_\_\_\_\_

 m2 = \_\_\_\_\_\_\_\_ m10 = \_\_\_\_\_\_\_\_

 m3 = \_\_\_\_\_\_\_\_ m11 = \_\_\_\_\_\_\_\_

 m4 = \_\_\_\_\_\_\_\_ m12 = \_\_\_\_\_\_\_\_

 m5 = \_\_\_\_\_\_\_\_ m13 = \_\_\_\_\_\_\_\_

 m6 = \_\_\_\_\_\_\_\_ m14 = \_\_\_\_\_\_\_\_

 m7 = \_\_\_\_\_\_\_\_ m15 = \_\_\_\_\_\_\_\_

 m8 = \_\_\_\_\_\_\_\_ m16 = \_\_\_\_\_\_\_\_

Geometry – GT/PreAP Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chapter 6 Review – Quadrilaterals Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_

Find each of the following values. Use parallelogram GRAM for problems 1-4.

|  |
| --- |
| \_\_\_\_\_\_\_1. GA = 3x – 10 and GP = x + 20. Find x.**R****M****A****G**2337**P** |
| \_\_\_\_\_\_\_2. mGMR = 37˚ and mAMG = 95˚, find mGRM. | \_\_\_\_\_\_\_\_3. mRGM = 75˚, find mGMA. |
| x = \_\_\_\_\_\_ 4. RA = 2x + y, GR = 3x – y, find x and y.y = \_\_\_\_\_\_ |

Use rectangle RECT for problems 5-8.

|  |
| --- |
| \_\_\_\_\_\_\_\_\_5. If TA = 3x – 7 and AC = 2x + 2, find x.**C****A****T****E****R**1234567891110 |
| \_\_\_\_\_\_\_\_\_6. If m2 = 33˚, find m11. | \_\_\_\_\_\_\_\_\_7. If RT = 2x + 5 and EC = 4x – 11, find x. |
| \_\_\_\_\_\_\_\_8. If m1 = x2 – 4 and m8 = x + 52, find x. |

Use rhombus RHOM for problems 9-11.

|  |
| --- |
| x=\_\_\_\_\_\_\_\_\_ 9. If MO = 24, MR = 4x + 2y + 2, and RH = 5x – y + 14, find x and y.**R****T****M****O****H**13245678y=\_\_\_\_\_\_\_\_\_ |
| \_\_\_\_\_\_\_\_\_10. If RO = 24 and MH = 10, find MR. | \_\_\_\_\_\_\_\_\_\_11. If m7 = 39˚, find m2. |

Use square SQUA for problems 12-14.

|  |
| --- |
| \_\_\_\_\_\_\_\_\_\_12. If AU = x2 + 2 and SA = 5x – 4, find x.**U****R****A****Q****S** |
| \_\_\_\_\_\_\_\_\_\_13. If mARS = 6x, find x. | \_\_\_\_\_\_\_\_\_14. If mQAU = 3x – 12, find x. |

Use trapezoid TUVW with median XY for problems 15-17.

**W**

**Y**

**Z**

**V**

**U**

**T**

104˚

54˚

\_\_\_\_\_\_\_\_15. mV

\_\_\_\_\_\_\_\_16. TU = 15, WV = 33, find ZY.

\_\_\_\_\_\_\_\_17. TU = x – 12, ZY = x + 15, and WV = 3x – 8. Find x.

Use isosceles trapezoid TRAP for problems 18-20.

**P**

**A**

**T**

**R**

32˚

79˚

9

10

7

6

5

4

3

8

2

1

\_\_\_\_\_\_\_18. Find m1.

\_\_\_\_\_\_\_19. Find m7.

\_\_\_\_\_\_\_20. Find m3.

In problems 21-23, if there is enough information to state that the quadrilateral is a parallelogram give the reason. Write none if there is not enough information to state that the quadrilateral is a parallelogram.

21. E is the midpoint of  and .

**D**

**C**

**E**

**A**

**B**

6

8

7

5

4

3

1

2

22.  and 

23.  and 

24. The coordinates of the vertices of quadrilateral ABCD are A(-4, -2), B(-1, 3), C(4, 0), and D(1, -5). Determine whether ABCD is a parallelogram, a rectangle, a rhombus, or a square. State yes or no for each and explain why or why not. Show work to support the explanations. For example, if you say the sides are parallel then you need to calculate the slopes.

 Parallelogram:

 Rectangle:

 Rhombus:

 Square:

25. The coordinates of the vertices of quadrilateral PQRS are P(4, 4), Q(1, 2), R(2, -2), and S(5, 0). Determine whether PQRS is a parallelogram, a rectangle, a rhombus, or a square. State yes or no for each and explain why or why not. Show work to support the explanations. For example, if you say the sides are parallel then you need to calculate the slopes.

 Parallelogram:

 Rectangle:

 Rhombus:

 Square:

26. The coordinates of the vertices of quadrilateral WXYZ are W(5, 0), X(6, -8), Y(-1, -4), and Z(-2, 4). Determine whether WXYZ is a parallelogram, a rectangle, a rhombus, or a square. State yes or no for each and explain why or why not. Show work to support the explanations. For example, if you say the sides are parallel then you need to calculate the slopes.

 Parallelogram:

 Rectangle:

 Rhombus:

 Square:

27. Find the coordinates of the 3 possible points for the missing vertex in a parallelogram if three of the vertices are A(-2, -1, B(-1, 3), and C(4, 1)

28. Given ABCD is a kite and m= 50˚, m2 = 40˚, and ED = 6, find:

**B**

**D**

**C**

**A**

**E**

1

3

2

4

5

6

7

8

 m8 = \_\_\_\_\_\_\_\_\_

 mADC = \_\_\_\_\_\_\_\_

 BD = \_\_\_\_\_\_\_\_

29. ∆ABC has midpoints D, E, and F. If the perimeter of

**C**

**E**

**D**

**A**

**B**

**F**

 ∆DEF is 23, then find the perimeter of ∆ABC.

30. KITE is a kite. M, N, O, and P are midpoints.

**E**

**M**

**N**

**T**

**K**

**I**

**O**

**P**

1

3

2

4

 mKMN = 30˚

 mKIT = 100˚

 Find: m1 = \_\_\_\_\_\_\_\_

 m2 = \_\_\_\_\_\_\_\_

 m3 = \_\_\_\_\_\_\_\_

 m4 = \_\_\_\_\_\_\_\_

31. ISOE is an isosceles trapezoid. T, R, A, and P are midpoints.

 IO = 12

**I**

**R**

**E**

**O**

**S**

**A**

**P**

**T**

1

2

3

 mRIT = 75˚

 mSRA = 40˚

 Find: m1 = \_\_\_\_\_\_\_\_

 m2 = \_\_\_\_\_\_\_\_

 m3 = \_\_\_\_\_\_\_\_

 RA = \_\_\_\_\_\_\_\_

 AP = \_\_\_\_\_\_\_\_