Geometry Homework #

Complete in your homework notebook

1.

Given: Quadrilateral $ABCD$ with $A(-5, 0)$, $B(1, -4)$, $C(5, 2)$, $D(-1, 6)$.
Prove: $ABCD$ is a rectangle.

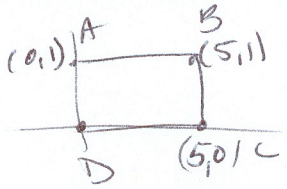
Slope AB $= \frac{-4-0}{1+5} = -4/6 = -2/3$ slope CD $= \frac{6-2}{-1-5} = \frac{4}{-6} = -2/3$

ABCD is a rectangle because it is a parallelogram with consecutive sides perpendicular

Slope BC $= \frac{2+4}{5-1} = \frac{6}{4} = 3/2$ slope DA $= \frac{6-0}{-1+5} = \frac{6}{4} = 3/2$

2.

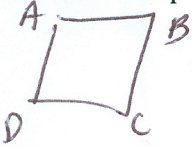
Write four possible coordinates for the vertices of a rectangle. Use slopes to show that your figure is a rectangle.



3.

slope of AB = 0
slope of BC = undefined
slope of DC = 0
slope of AD = undefined.

Given $A(1, 1)$, $B(0, 5)$, $C(4, 4)$, and $D(5, 0)$. Use the fact that if the diagonals of a parallelogram are perpendicular, then it is a rhombus to prove $ABCD$ is a rhombus.



4.

So ABCD is a rhombus diagonals ⊥

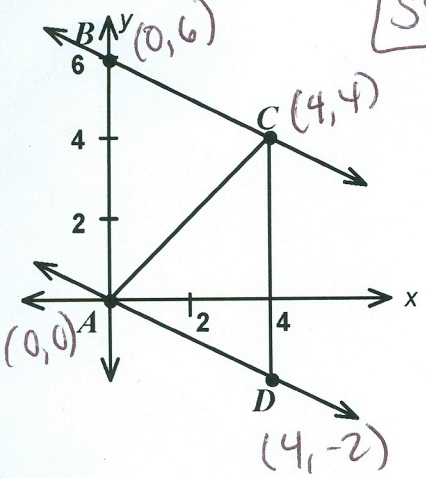
AC and BD are diagonals

Slope of AC $= \frac{4-1}{4-1} = \frac{3}{3} = 1$

Slope of BD $= \frac{0-5}{5-0} = \frac{-5}{5} = -1$

Prove that $\Delta ABC \cong \Delta CDA$.

SSS



AC = AC reflexive.

$CD = \sqrt{(4-4)^2+(4+2)^2} = 6$

$AB = 6$

$BC \sqrt{(0-4)^2 + (6-4)^2} = \sqrt{16+4} = \sqrt{20}$

$AD = \sqrt{(4)^2 + (-2)^2} = \sqrt{20}$

#5-7

Find the area and perimeter of rectangle $ABCD$ with vertices $A(3, 7)$, $B(9, 7)$, $C(9, -1)$, and $D(3, -1)$.

Find the perimeter of ΔPQR with vertices $P(-2, 9)$, $Q(7, -3)$, and $R(-2, -3)$. QR $\sqrt{(13}$

PQ $\sqrt{(-2-7)^2 + (9+3)^2} = \sqrt{81+144} = \sqrt{195}$

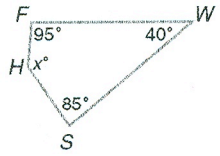
The circumference of a circle is 26π. Find the diameter and the radius.

$d = 26$
$r = 13$

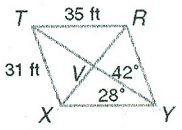
Ans. Key

CHAPTER 8 Test

1. Name a diagonal in quadrilateral $FHSW$. FS HW
2. Name a side consecutive with $\overline{SW}$. WF SH
3. Find the measure of the missing angle in quadrilateral $FHSW$. 360 − 220 = 140
4. In $\square XTRY$, find XY and RY. XY = 35 RY = 31
5. Name the angle that is opposite $\angle XYR$. ∠XTR
6. Find $m\angle XTR$. 28 + 48 = 76°
7. Find $m\angle TRY$. 180 − 76 = 104°
8. If $TV = 32$, find TY. 64
9. In square $GACD$, if $DA = 14$, find BC. 7
10. Find $m\angle DBC$. 90°



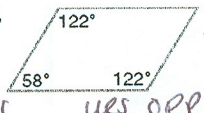
Exercises 1–3



Exercises 4–8

Exercises 9–10

Determine whether each quadrilateral is a parallelogram. Write *yes* or *no*. If yes, give a reason for your answer.

11.  yes diagonals bisect
12.  yes opp. angles ≅
13.  No
14.  yes square

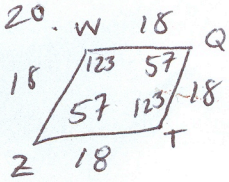
Identify each figure as a *quadrilateral*, *parallelogram*, *rhombus*, *rectangle*, *square*, *trapezoid*, or *none of these*.

15.  Trapezoid
16.  None
17.  Rectangle
18.  Rhombus.

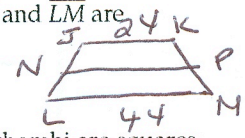
19. Determine whether quadrilateral $ADHT$ is a parallelogram. Support your answer with reasons. yes 1 pair of opp. sides ∥ + ≅

Exercise 19

20. In rhombus $WQTZ$, the measure of one side is 18 yards, and the measure of one angle is 57. Determine the measures of the other three sides and angles.



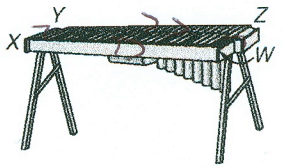
21. NP is the median of isosceles trapezoid $JKML$. If $\overline{JK}$ and $\overline{LM}$ are the bases, $JK = 24$, and $LM = 44$, find NP.



½(24 + 44) = NP
34 = NP

Identify each statement as *true* or *false*.

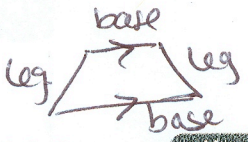
22. All squares are rectangles. T
23. All rhombi are squares. F
24. **Music** A series of wooden bars of varying lengths are arranged in the shape of a quadrilateral to form an instrument called a xylophone. In the figure, $\overline{XY} \parallel \overline{WZ}$, but $\overline{XW} \nparallel \overline{YZ}$. What is the best description of quadrilateral $WXYZ$? parallelogram



25. **Algebra** Two sides of a rhombus measure $5x$ and $2x + 18$. Find x.

$5x = 2x + 18$
$3x = 18$
$x = 6$

Check for Understanding



Vocabulary
trapezoid
bases
legs
base angles
median
isosceles trapezoid

Communicating Mathematics

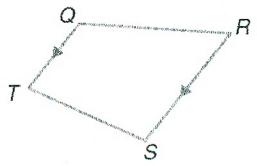
1. **Draw** an isosceles trapezoid and label the legs and the bases.
2. **Explain** how the length of the median of a trapezoid is related to the lengths of the bases. 1/2(Sum of bases)
3. Writing Math Copy and complete the following table. Write *yes* or *no* to indicate whether each quadrilateral always has the given characteristics.

Characteristics	Parallelogram	Rectangle	Rhombus	Square	Trapezoid
Opposite sides are parallel.	✓	✓	✓	✓	
Opposite sides are congruent.	✓	✓	✓	✓	
Opposite angles are congruent.	✓	✓	✓	✓	
Consecutive angles are supplementary.	✓	✓	✓	✓	✓
Diagonals bisect each other.	✓	✓	✓	✓	
Diagonals are congruent.		✓		✓	
Diagonals are perpendicular.			✓	✓	
Each diagonal bisects two angles.			✓	✓	

Guided Practice

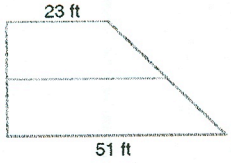
Example 1

4. In trapezoid $QRST$, name the bases, the legs, and the base angles.



Example 2

Find the length of the median in each trapezoid.

5. 

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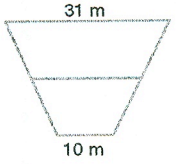
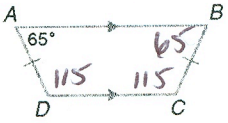
6. 

41/2

Example 3

7. Trapezoid $ABCD$ is isosceles. Find the missing angle measures.



Durbec **GEOMETRY**

AG-COORDINATE PROOFS

DO NOW:

Define...

a) Coordinate – Anything really points (x, y) x and y axis

b) Proof – logical explanation proving a statement by using facts, theorems, + definitions

Notes:

Review Material

Answer the following about the properties of polygons

1. What makes a right triangle different from a standard triangle?
2. What makes an isosceles triangle different from a standard triangle?
3. What properties define a parallelogram?
4. What special properties does a rectangle have?
5. What special properties does a square have?
6. What special properties does a rhombus have?

Answers:

1) Has one right angle, fits $a^2+b^2=c^2$

2) Has 2 sides and 2 angles congruent

3) • Opposite sides parallel + congruent
opposite ∠s congruent
diagonals bisect each other

4) Right angles + diagonals ≅

5) Rt angles, all sides ≅, diagonals are ⊥ and ≅

6) All sides ≅, diagonals ⊥

We will use these distinctive properties of the polygons to prove their shape. We will use distance formula, midpoint, and slope to prove the properties of the special polygons

Durbec

GEOMETRY

AG-COORDINATE PROOFS

Fill in the formulas for...

7. Distance = $d = \sqrt{(x_2-x_1)^2 + (y_2-y)^2}$
8. Slope= $\frac{y_2-y_1}{x_2-x_1}$
9. Midpoint $\left(\frac{x_2+x_1}{2}, \frac{y_2+y_1}{2}\right)$

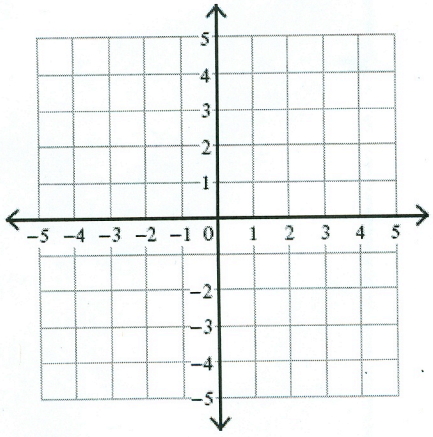
We will now use our knowledge of formulas and properties of polygons to prove shape. We will use the coordinate plane and known formulas to state our case.

10. How could we prove a triangle is a right triangle?

has a right angle, fits pythagorean theorem

Prove that $A(0, 1)$, $B(3, 4)$, $C(5, 2)$ is a right triangle.

11.



Slope of $AB = \frac{4-1}{3-0} = \frac{3}{3} = 1$

Slope of $BC = \frac{2-4}{5-3} = \frac{-2}{2} = -1$

$\triangle ABC$ is right $\triangle$ because AB and BC are perpendicular (form right $\measuredangle$)

12. What formulas and methods did you use to prove that triangle ABC is a right triangle? Slope

13. How could we prove that a quadrilateral is a parallelogram?
    a) Prove Opposite sides are congruent
    b) Prove opposite sides are parallel
    c) Prove diagonals bisect each other.

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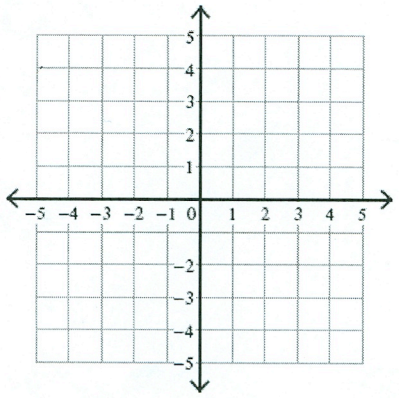
AG-COORDINATE PROOFS

14. Prove that the quadrilateral with the coordinates L(-2,3), M(4,3), N(2,-2) and O(-4,-2) is a parallelogram.



slope of LM = $\frac{3-3}{4+2} = \frac{0}{6} = 0$

slope of MN = $\frac{-2-3}{2-4} = \frac{-5}{-2} = 5/2$

slope of NO = $\frac{-2+2}{-4-2} = \frac{0}{-6} = 0$

slope of LO = $\frac{-2-3}{-4+2} = \frac{-5}{-2} = 5/2$

15. LMNO is a parallelogram because opposite sides are parallel

16. How could we prove that a parallelogram is a rectangle?

show consecutive sides are perpendicular OR show diagonals congruent

17. There are few methods to prove that a parallelogram is a rectangle. Which method is the easiest? slope

18. Prove a quadrilateral with vertices G(1,1), H(5,3), I(4,5) and J(0,3) is a rectangle.

slope $\overline{GH}$ = $\frac{3-1}{5-1} = \frac{2}{4} = 1/2$

Slope $\overline{HI}$ = $\frac{5-3}{4-5} = \frac{2}{-1} = -2$

slope IJ = $\frac{3-5}{0-4} = \frac{-2}{-4} = 1/2$

slope GJ = $\frac{3-1}{0-1} = \frac{2}{1} = 2$

19. Parallelogram GHIJ is a rectangle because opposite sides // and has Right angles because consecutive sides are ⊥

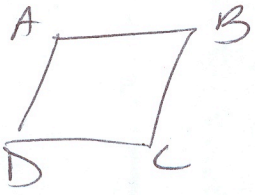
Durbec **GEOMETRY**

AG-COORDINATE PROOFS

20. How can we prove a parallelogram is a Rhombus?
    a) Prove Diagonals are perpendicular
    b) Prove all side are congruent

21. Which method is the easiest?

22. Prove that a quadrilateral with the vertices A(-1,3), B(3,6), C(8,6) and D(4,3) is a rhombus.



$AD = \sqrt{25 + 0} = 5$

$AB = \sqrt{16 + 9} = 5$

slope $AC = \frac{6-3}{8+1} = \frac{3}{9} = \frac{1}{3}$

slope $BD = \frac{3-6}{4-3} = \frac{-3}{1}$

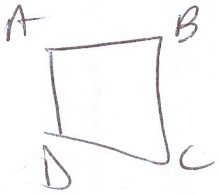
23. Parallelogram ABCD is a rhombus because consecutive sides $\cong$ diagonals $\perp$

24. How can we prove a parallelogram is a square?
    a) All sides $\cong$
    b) Angles are $\cong 90°$
    c) Diagonals are $\perp$
    d) Diagonals are $\cong$

25. A square shares the same properties of a rectangle and rhombus. How are we going to show the parallelogram is a square and not a rectangle or rhombus?

all sides $\cong$ AND angles $= 90$
diagonals $\cong$ AND $\perp$

26. Prove that the quadrilateral with vertices A(-1,0), B(3,3), C(6,-1) and D(2,-4) is a square.



$AC = \sqrt{49 + 1} = \sqrt{50}$

$DB = \sqrt{1 + 49} = \sqrt{50}$

$m\,AC = \frac{-1-0}{6+1} = \frac{-1}{7}$

$m\,DB = \frac{-4-3}{2-3} = \frac{-7}{-1} = 7$

27. ABCD is a square because diagonals $\cong$ and $\perp$