Geometry

Chapter 13 2013-2014

Coordinate Geometry

Slope, Distance, Midpoint

Equation of a Circle

Equation of a line

System of Equations Graphically

Proofs

Coordinate Geometry

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*Additional suggested review

pg. 199 #9-11 (Chapter Test)

pg. 547 #1-7, 10, 11, 15 (Self Test 1)

Pg. 558-559 #2-10 Even

pg. 563 #6-9 all (Self Test 2)

Pg. 567 #1-25, Except #14

Any question not completed from the various worksheets!

IF YOU HAVE QUESTIONS, PLEASE COME IN FOR EXTRA HELP!

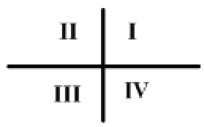
Learn the math by doing the Math!

Name ______________________________________ Geometry

Date _____________ Coordinate Plane Intro.

Remember from last year's Algebra Course:

Quadrants:



given 2 points: (x_1, y_1) and (x_2, y_2)

Slope: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

Equations of Lines:

1) y-intercept form (need slope and y-intercept)
   $y = mx + b$

2) point-slope form (need 1 point & slope)
   $y - y_1 = m(x - x_1)$

3) standard form
   $Ax + By = C$

Parallel lines: equal slopes

Perpendicular lines: slopes are negative reciprocals or 1 line is horizontal (slope = 0) and the other line is vertical (slope undefined)

New for Chapter 13:

Distance: $D = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$

equation of a circle: $(x-h)^2 + (y-k)^2 = r^2$
with center: (h,k)
with radius of length r

Midpoint Formula: $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

perpendicular bisector: equation of line through the midpoint of a side and perpendicular to that side

1) Find the slope of the side the perpendicular bisector will intersect
2) Use the negative reciprocal slope for perpendicular (unless special case with vertical & horizontal)
3) Find the midpoint of the side the perpendicular bisector will intersect
4) Substitute the midpoint and the perpendicular slope: $y - y_1 = m(x - x_1)$
5) Solve equation for $y = mx + b$

Section 13-2: The Slope of a Line
Section 13-3: Parallel and Perpendicular Lines

1. What can you say about the slope of a line (be specific) that is parallel to:
   a) a vertical line   b) a horizontal line   c) any other line

2. What can you say about the slope of a line (be specific) that is perpendicular to:
   a) a vertical line   b) a horizontal line   c) any other line

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3. The vertices of $\blacktriangle QRS$ are Q(8,7), R(-1,1), and S(-3,4). Find the slopes of the sides of the triangle. Then state whether $\blacktriangle QRS$ is a right triangle and explain why.

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4. The vertices of $\blacktriangle RST$ are R(-5,6), S(-1,2) and T(5,8). Use the slopes to determine whether $\blacktriangle RST$ is a right triangle and explain.

5. Find the slope of $\overline{AB}$. Please simplify all answers to their simplest form.

a. A(4, 6), B(16 ,12)
b. A(4, 12), B(-3, -2)
c. A(-4,18), B(-4 ,22)
d. A(6 ,13), B(-9 ,13)
e. A(9,10), B(-1 , 15)
f. A(12,-1), B(10, 1)
g. A(15, -6), B(18 ,0)

6. Write the equation of a line that is parallel to y = 2x + 5 and pass through the point (0, 8).

Write the slope of a line that is parallel to each line.

7. $y = 12 - x$ 8. $2x - y = 4$ 9. $3x = 18 + 2y$

10. $-5x + 2y = 6$ 11. $x = 5$ 12. $y = -1$

Write the slope of a line that is perpendicular to each line.

13. $y = 5 + x$ 14. $2x - 4y = 12$ 15. $x = 7y - 14$

16. $-5x - 3y = 6$ 17. $x = 8$ 18. $y = -7$

Write an equation in slope-intercept form for a line containing the point (-2, -5) and:

19. is parallel to the line $2x - y = 6$

20. is perpendicular to the line $y = -2x - 3$

Write an equation in slope-intercept form for a line containing the point (1, -4) and:

21. is parallel to the line $3x = y - 6$

22. is perpendicular to the line $6y = -9x - 12$

Write an equation for a line containing the point (-4, 5) and:

23. is parallel to the line $y = 9$

24. is perpendicular to the line $x = -2$

Write an equation for a line containing the point (-1, -7) and:

25. is parallel to the line $x = 2$

26. is perpendicular to the line $x = -1$

Section 13-1: The Distance Formula & The Equation of a Circle

Find the distance between the points. Express your answer in simplest radical form.

1. (-1, 1) and (3, 3)
2. (0, 4) and (-3, 2)
3. (-1, 7) and (2, 5)
4. (-5, -3) and (4, 6)
5. (-7, 5) and (3, 0)
6. (-2, 1) and (-6, 5)

For each of the following find the exact value of AB (all answers should be in simplest radical form).

7. A(-1, 5), B(4 18,)
8. A(9, 3), B(8 ,-4)
9. A(-3,6), B(5, -4)
10. A(8,8), B(10 ,2)
11. A(0, 20), B(10 ,-10)
12. A(0, -2), B($\sqrt{2}$,3)
13. A(-2 , -6), B(-157, -6)

14. The vertices of $\blacktriangle DEF$ are D(4,1), E(2,-4) and F(-1,-1). Use slopes to show whether $\blacktriangle DEF$ is a right triangle. Then find the distance of all of the sides and determine whether the triangle is scalene, isosceles, or equilateral.

15. The vertices of $\blacktriangle ABC$ are A(4,5), B(8,13), and C(-4,9). Use slopes to show whether $\blacktriangle ABC$ is a right triangle. Then find the distance of all of the sides and determine whether the triangle is scalene, isosceles, or equilateral.

16. Given $\blacktriangle RST$ with vertices R(0,6), S(2,0), and T(8,2), show that $\blacktriangle RST$ is a right triangle.

17. Given points A(0,0), B(4,8) and C(6,2) as the vertices of $\blacktriangle ABC$, show that $\blacktriangle ABC$ is isosceles.

18. $\blacktriangle ABC$ has vertices A(-2,-2), B(5,-1), and C(-1,5). Use coordinate geometry to show that $\blacktriangle ABC$ is isosceles.

19. The vertices of $\blacktriangle ABC$ are A(3,-1), B(7,3), and C(-1,7).
    Prove that $\blacktriangle ABC$ is isosceles.
    Prove that $\blacktriangle ABC$ is not equilateral.

20. The coordinates of the vertices of $\triangle TAG$ are T(1,3), A(8,2), and G(5,6). Prove that $\triangle TAG$ is an <u>isosceles right triangle</u>.

For each of the following, provide an equation of a circle given the conditions provided.

21. center (6, 8) r = 15

22. center (-12, 15) r = $\frac{1}{2}$

23. center (0, -1) d = 10

24. center (0, 0) r = $\sqrt{6}$

25. center (-19, 4.5) r = $3\sqrt{2}$

Use the equation provided to find the center and radius. All answers should be in simplest form.

26. $(x-4)^2+(y-18)^2=49$

27. $(x+7)^2+(y-1)^2=15$

28. $(x-2.1)^2+(y+1)^2=98$

29. $x^2+(y+10)^2=363$

Given the equation, find the exact value of the x- and y-intercepts.

30. $(x+1)^2+(y-2)^2=5$

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31. Find the equation of the circle with a center (0,8) which passes through point (6,16).

32. Find the equation of the circle which has a diameter with endpoints of (-5, 2) and (1, 2).

Section 13-5: The Midpoint Formula

Find the coordinates of the midpoint of the segment that joins the given points.

1. (-5, 2) and (4,-2) 2. (3, 0) and (-5, 5) 3. (-1, 1) and (3, 3)
4. (1.3, 2.4) and (2.5, 1.6) 5. (a,b) and (c,d)

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6. M is the midpoint of $\overline{AB}$. Given M(-3,0) and A(4,6), find the coordinates of point B.

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7. Find the equation of the perpendicular bisector of $\overline{QR}$, if Q (-6, 0) and R (12, 0).

8. Given $\overline{AB}$ with A(-2, 6) and B(-8, 10). Write the equation of the perpendicular bisector of $\overline{AB}$.

9. Graph ΔABC with $A(-3,-2), B(-1,5), C(7,1)$
b. Find the equation of the perpendicular bisector of side BC.

10. Graph ΔABC with $A(-4,-2), B(-3,6), C(8,6)$
b. Find the equation of the perpendicular bisector of side AC.

Chapter 13 Review… so far

1. The coordinates of the midpoint of segment AB are (-7, 6). If the coordinates of point A are (2, -4) and the coordinates of B are (-16, y), what is the value of y?

2. The coordinates of A and B are (2a, 4b) and (8a, 6b), respectively. Express in terms of a and b, the coordinates of the midpoint of segment AB.

3. Write and equation of the line that passes through points (2, 3) and (4, 5).

4. What is the length of the line segments joining points J(1, 5) and K(3, 9) in simplest radical form.

5. Write in slope-intercept form the equation of a line perpendicular to 4x + y = 10.

6. Find the slope of the lines 6x + 3y = 10 and y = -2x + 5.
   What can you conclude about these lines?

7. Use algebra to find each point at which the line x - 2y = -5 intersects the circle $x^2 + y^2 = 25$.

8. Find an equation of the line through (1, 2) and parallel to the line y = 3x – 7. (answer in point-slope form)

9. Give an equation of the perpendicular bisector of the segment joining (5, 1) and (-3, 7).

10. Write the equation of a line through (5, -1) and parallel to the line x = 6.

11. Find the center and radius of the circle with equation $(x-4)^2 + (y+7)^2 = \frac{1}{25}$.

12. Write the equation of a circle whose canter is (-2, 0) and has a radius of $\sqrt{11}$.

13. Sketch the graph of $(x-3)^2 + (y+2)^2 = 36$.

14. Show that triangle with vertices A(-3, 4), M(3, 1) and Y(0, -2) is isosceles.

15. Write the equation of a circle that has center (-2, -4) and passes through the point (3, 8).

Altitude, Median, Bisectors WS
Geometry
Chapter 13

Name ______________________
Date __________ Block _______

altitude: equation of line through vertex and perpendicular to the opposite side

1) Find the slope of the side that the altitude will intersect
2) Use the negative reciprocal slope for perpendicular
(unless special case with vertical & horizontal)
3) Substitute the vertex and the perpendicular slope into:
$y - y_1 = m(x - x_1)$
4) Solve equation for $y = mx + b$

median: equation of line through vertex and midpoint of the opposite side

1) Find the midpoint of the side opposite the vertex
2) Calculate the slope for the median line using the midpoint and the vertex in the slope formula
3) Substitute the vertex point and the slope into:
$y - y_1 = m(x - x_1)$
4) Solve equation for $y = mx + b$

perpendicular bisector: equation of line through the midpoint of a side and perpendicular to that side

1) Find the slope of the side the perpendicular bisector will intersect
2) Use the negative reciprocal slope for perpendicular
(unless special case with vertical & horizontal)
3) Find the midpoint of the side the perpendicular bisector will intersect
4) Substitute the midpoint and the perpendicular slope:
$y - y_1 = m(x - x_1)$
4) Solve equation for $y = mx + b$

Use graph paper to graph each triangle. Find the equation of the line algebraically, showing all work. Then graph the equation of the line on your graph with the triangle.

1.

a) Graph ΔABC.
A(1, 3), B(3, 8), C(5, 6)

b) Find the equation of altitude $\overline{BF}$.

2.

a) Graph ΔABC
A(-4,-2) B(4,-3) C(-1,-8)

b) Find the equation of altitude $\overline{BF}$.

3.

a) Graph ΔABC
A(-2,1) B(-1,9) C(4,5)

b) Find the equation of the median from vertex B.

4.

a) Graph ΔABC
A(-7,-2) B(4,2) C(3,-6)

b) Find the equation of the median which passes through vertex B.

5.

a) Graph ΔABC
A(-3,-2) B(-1,5) C(7,1)

b) Find the equation of the perpendicular bisector of side BC.

6.

a) Graph ΔABC
A(-4,-2) B(-3,6) C(8,6)

b) Find the equation of the perpendicular bisector of side **AC**.

Name ______________________________ Geometry

Date _________ "To Prove" WS

Necessary to Prove
(for Coordinate Geometry Proofs)

I. Triangles

1. Isosceles ▲: 2 segments ≅ (distance)
2. Equilateral ▲: 3 segments ≅ (distance)
3. Right ▲: (choose one)

a. Pythagorean Theorem ($a^2 + b^2 = c^2$)

b. 2 sides ⊥ (use slope - show negative reciprocal)

II. Quadrilaterals

1. Parallelogram: (choose one)
   a. Both pairs of opposite sides ≅ (distance)
   b. Both pairs of opposite sides || (slope)
   c. Same set of opposite sides both || **AND** ≅
      (slope & distance of 1 pr opposite sides)
   d. Diagonals bisect each other (midpoint)

2. Rectangle: (choose one)
   a. Parallelogram **AND** one right ∠
   b. Parallelogram **AND** diagonals ≅

NOTE: If the slopes of two lines/segments are 0 and undefined , then the lines/segments are horizontal and vertical respectively. Therefore, the lines/segments are perpendicular.

3. Rhombus: (choose one)
   a. 4 sides ≅ (distance)
   b. Parallelogram and 2 consecutive sides ≅

4. Square: (choose one)
   a. 4 sides ≅ and 1 right ∠
   b. 4 sides ≅ and diagonals ≅

5. Trapezoid:
   a. Bases || AND legs NOT ||

6. Isosceles Trapezoid:
   a. Bases || AND legs NOT || AND legs ≅

Using the information provided, prove the given quadrilateral. Write a complete, detailed paragraph.

1. Prove ABCD is a Parallelogram if:

Slope $\overline{AB}$ = 4

Slope $\overline{BC}$ = $\frac{-1}{2}$

Slope $\overline{CD}$ = 4

Slope $\overline{AD}$ = $\frac{-1}{2}$

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2. Prove ABFE is a Parallelogram if:

AB = 13

BF = 21

FE =13

AE = 21

3.Prove QWER is a Rhombus if:

QW=12

WE = 12

ER = 12

QR = 12

---

4. Prove that ABCD is a rectangle if:

Slope $\overline{AB}$ = -3

Slope $\overline{BC}$ = $\frac{1}{3}$

Slope $\overline{CD}$ = -3

Slope $\overline{AD}$ = $\frac{1}{3}$

5. Prove that SQUA is a square if:

Slope $\overline{SQ}$ = $\frac{7}{8}$

Slope $\overline{QU}$ = $\frac{-8}{7}$

Slope $\overline{UA}$ = $\frac{7}{8}$

Slope $\overline{AS}$ = $\frac{-8}{7}$

UA=1

AS=1

6. Prove that YUOP is a Parallelogram if

Slope $\overline{YU}$ = 1

Slope $\overline{OP}$ = 1

YU = 8

OP = 8

7. Prove TRAP is a trapezoid if

Slope $\overline{TR}$ = 1

Slope $\overline{RA}$ = -1

Slope $\overline{AP}$ = 1

Slope $\overline{TP}$ = $\frac{1}{2}$

Can you tell me anything else about the trapezoid with the given information?

8. The vertices of quadrilateral ABCD are A(1,1), B(3,4), C(9,1), and D(7,-2). Prove that ABCD is a parallelogram by showing that both pair of opposite sides are parallel.

9. Quadrilateral ABCD has vertices A(4,4), B(2,0), C(-4,-2), and D(-2,2). Prove that ABCD is a parallelogram by showing that opposite sides are congruent.

10. Quadrilateral ABCD has vertices A(1,8), B(10,10), C(9,6), and D(0,4). Prove that ABCD is a parallelogram by showing that one pair of opposite sides are both parallel and congruent.

11. Quadrilateral ABCD has vertices A(0,-1), B(6,1), C(8,7), AND D(2,5). Prove that ABCD is a parallelogram by showing that the diagonals bisect each other.

12. The vertices of quadrilateral PQRS are P(0,2), Q(4,8), R(7,6), and S(3,0). Prove that PQRS is a rectangle.

13. Quadrilateral ABCD has vertices A(5,0), B(2,9), C(-4,7), and D(-1,-2). Use slopes to prove that ABCD is a rectangle.

14. Quadrilateral PQRS has vertices P(0,0), Q(4,3), R(7,-1), and S(3,-4). Show that PQRS is a square.

15. Quadrilateral MATH has vertices M(-1,4), A(4,7), T(7,2), and H(2,-1). Prove that MATH is a square.

16. Quadrilateral ABCD has vertices A(1,-1), B(11,4), C(22,6), and D(12,1). What kind of quadrilateral is ABCD and WHY? (hint: check lengths AB & BC too!)

17. Quadrilateral FGHJ has vertices F(-2,5), G(-4,1), H(-2,-3) and J(0,1). Show that FGHJ is a rhombus.

18. Quadrilateral ABCD has vertices A(-3,6), B(6,0), C(9,-9), and D(0,-3). Prove that ABCD is a parallelogram but NOT a rhombus.

19. Quadrilateral ABCD has vertices A(0,-1), B(6,1), C(8,7), and D(2,5). Show that ABCD is a rhombus by showing that it has 4 congruent sides. Then show that the diagonals of ABCD are perpendicular ($\overline{AC} \perp \overline{BD}$).

20. Quadrilateral ABCD has vertices A(5,2), B(6,7), C(14,15), and D(19,16). What kind of quadrilateral is ABCD and WHY? (hint: check lengths AB & CD too!)

21. Quadrilateral ABCD has vertices A(-6,3), B(-3,6), C(9,6), and D(-5,-8). Prove that ABCD is a trapezoid but NOT an isosceles trapezoid.

22. Quadrilateral DEFG has vertices D(-4,0), E(0,1), F(4,-1), and G(-4,-3). Show that DEFG is a trapezoid but NOT an isosceles trapezoid.

23. Given Triangle TRI with T(4,1), R(3,0), I(1,4). Show that TRI is a right triangle.

24. Given Triangle ABC with A(-1,4), B(7,0), C(-5,12). Show that ABC is isosceles.

25. Given Triangle EFG with E(-1,-1), F(3,2), G(-4,3). Show that EFG is an isosceles right triangle.

26. Given Triangle WTA with W(4,7), T(-1, 6), A(2,1). Classify this triangle by its

Coordinate Geometry Proof #2 Name ______________________
Geometry Date ________ Block _______

Show all work on a separate paper, including formulas and reasons for your statements in each proof.

1. Given Quad ABCD with A(0,0) B(4,2), C(3,3) D(1,2). Prove that ABCD is a trapezoid, but not isosceles.

2. Given Quad RECT with R(1,1) E(5,1) C(5,3) T(1,3). Prove that RECT is a rectangle.

3. Given Quad RHOM with R(6,6) H(11,6) O(8,2) M(3,2). Show that RHOM is a rhombus but not a square.

4. Given Quad FOUR with F(2,4) O(15,4) U(16,-8) R(2,-8), prove that FOUR is a right trapezoid.

5. Given TRPZ with T(0,0) R(a,0) P(a-b,c) Z(b,c), prove that TRPZ is an isosceles trapezoid.

6. Given triangle TRI with T(0,0) R(3,4) I(-4,3) is a right isosceles triangle.

7. Given PARL with P(a,b) A(c,d) R(c+e,d+f) L(a+e,b+f), show that PARL is a parallelogram.

8. Given SQUA with S(5,0) Q(0,5) U(-5,0) A(0,-5). Prove that SQUA is a square.

9. Given the isosceles trapezoid with points T(-2, -1) R(1,1) A(6,1) P (9,-1). Prove that the diagonals are congruent but do not bisect each other.

10. Given SQUA with S(-3,1) Q(1,4) A(4,0) R(0,-3), show that the diagonals bisect, are perpendicular and are congruent.

11. Given the points A(1,4) B(-3,8) find the equation of the perpendicular bisector.

12. Given the points A(4,2) B(-6, 4) find the equation of the perpendicular bisector.

13. Given the points A(1,5) B(6,-1). Find the equation of the line that passes through point C (2,-7) and is parallel to $\overline{AB}$.

14. a. Prove RECT is a rectangle given R(4,1) E(9,1) C(9,-5) and T(4,-5).
b. Prove the diagonals of the rectangle bisect each other

15. a. Prove SQUA is a Square if S(-1,-1) Q(3,-1) U(3,-5) A(-1,-5).
b. Prove that the diagonals are perpendicular

16. a. Prove TRAP is a right trapezoid T(0,0) R(0,5) A(1,5) and P(1,-1).
b. Prove that the trapezoid is not isosceles.

17. Given $\overline{AB}$ with midpoint M. Given A(5,-1) and M(-1,3), find B.

18. Given $\overline{AB}$ with midpoint M. Given M(.23, -7.2) and B(13,-5.63), find A.

19. Determine the equation of a circle with a diameter of 8 and a center of (-4,6).

20 Find the equation of a circle with endpoints on its diameter of (4,5) and (-2,-3).

21. Given the equation of line m as $2x + y = 8$, find the equation of the line parallel to m going through the point (-4,1).

22. Given the equation of line l as $x + 4y = 7$, find the equation of the line perpendicular to l going through the point (-1,-3).

Generic Coordinate Proof WS #3 Name ______________________
Geometry Date _________ Block ______

1. The vertices of $\blacktriangle DEF$ are D(0,0), E(a,0), and F(0,b). Find the lengths of each side of the triangle. What kind of triangle is this (scalene, isosceles, or equilateral)?

2. The vertices of $\blacktriangle ABC$ are A(-a,0), B(a,0), and C(0,b). Find the lengths of the sides of the triangle. What kind of triangle is this (scalene, isosceles, or equilateral)?

3. Given Rectangle ABCD with vertices A(0,0), B(a,0), C(a,b), and D(0,b). Show that the diagonals are congruent.

4. Quadrilateral ABCD has vertices A(-a,0), B(a,0), C(a,b), and D(-a,b). Prove that ABCD is a rectangle.

5. Quadrilateral QRST has vertices Q(0,0), R(d,e), S(d,e+f), and T(0,f). Show that QRST is a parallelogram.

6. The vertices of RSTV are R(0,0), S(a,0), T(a+b,c), and V(b,c).
   a. Find the slopes of $\overline{RV}$ and $\overline{ST}$.
   b. Find the lengths RV and ST.
   c. Show that RSTV is a parallelogram (one pair opposite sides $\|$ and $\cong$)

7. The vertices of quadrilateral ABCD are A(0,0), B(r,s), C(r,s+t), and D(0,t).
   a. Represent the slopes of $\overline{AB}$ and $\overline{CD}$.
   b. Represent the lengths of AB and CD.
   c. Show that ABCD is a parallelogram.

8. The vertices of ABCD are A(0,0), B(a,0), C(a,b), and D(0,b).
   a. Show that ABCD is a parallelogram.
   b. Show the diagonals are congruent ($\overline{AC} \cong \overline{BD}$).
   c. Show that ABCD is a rectangle.

9. The vertices of GAME are G(r,s), A(0,0), M(t,0), and E(t+r,s). Prove that GAME is a parallelogram.

10. Given Rhombus ABCD with vertices A(0,0), B(a,0), C(a+b,c), and D(b,c). Prove that the diagonals of a rhombus are perpendicular ($\overline{AC} \perp \overline{BD}$).

11. Quadrilateral ABCD has coordinates A(0,0), B(6a,3b), C(3a,4b), and D(a,3b) with $a \neq 0$ and $b \neq 0$.
    a. Show that $\overline{AB} \,||\, \overline{CD}$.
    b. Show that $\overline{AD}$ is not parallel to $\overline{BC}$.
    c. Which kind of quadrilateral is ABCD and WHY?

Coordinate Geometry Proofs Name ____________________________
Geometry – Day 2 and 3 Date _________ Block ________

Show all work on a separate paper, including formulas and reasons for your statements in each proof.

1. Given Quad ABCD with A(0,0) B(4,2), C(3,3) D(1,2). Prove that ABCD is a trapezoid, but not isosceles.

2. Given Quad RECT with R(1,1) E(5,1) C(5,3) T(1,3). Prove that RECT is a rectangle.

3. Given Quad RHOM with R(6,6) H(11,6) O(8,2) M(3,2). Show that RHOM is a rhombus but not a square.

4. Given Quad FOUR with F(2,4) O(15,4) U(16,-8) R(2,-8), prove that FOUR is a right trapezoid.

5. Given TRPZ with T(0,0) R(a,0) P(a-b,c) Z(b,c), prove that TRPZ is an isosceles trapezoid.

6. Given triangle TRI with T(0,0) R(3,4) I(-4,3) is a right isosceles triangle.

7. Given PARL with P(a,b) A(c,d) R(c+e,d+f) L(a+e,b+f), show that PARL is a parallelogram.

8. Given SQUA with S(5,0) Q(0,5) U(-5,0) A(0,-5). Prove that SQUA is a square.

9. Given the isosceles trapezoid with points T(-2, -1) R(1,1) A(6,1) P (9,-1). Prove that the diagonals are congruent but do not bisect each other.

10. Given SQUA with S(-3,1) Q(1,4) A(4,0) R(0,-3), show that the diagonals bisect, are perpendicular and are congruent.

11. Given the points A(1,4) B(-3,8) find the equation of the perpendicular bisector.

12. Given the points A(4,2) B(-6, 4) find the equation of the perpendicular bisector.

13. Given the points A(1,5) B(6,-1). Find the equation of the line that passes through point C (2,-7) and is parallel to $\overline{AB}$.

14. a. Prove RECT is a rectangle given R(4,1) E(9,1) C(9,-5) and T(4,-5).
    b. Prove the diagonals of the rectangle bisect each other

15. a. Prove SQUA is a Square if S(-1,-1) Q(3,-1) U(3,-5) A(-1,-5).
    c. Prove that the diagonals are perpendicular

16. a. Prove TRAP is a right trapezoid T(0,0) R(0,5) A(1,5) and P(1,-1).
    c. Prove that the trapezoid is not isosceles.

17. Given $\overline{AB}$ with midpoint M. Given A(5,-1) and M(-1,3), find B.

18. Given $\overline{AB}$ with midpoint M. Given M(.23, -7.2) and B(13,-5.63), find A.

19. Determine the equation of a circle with a diameter of 8 and a center of (-4,6).

20 Find the equation of a circle with endpoints on its diameter of (4,5) and (-2,-3).

21. Given the equation of line m as $2x + y = 8$, find the equation of the line parallel to m going through the point (-4,1).

22. Given the equation of line l as $x + 4y = 7$, find the equation of the line perpendicular to l going through the point (-1,-3).

23. The vertices of $\blacktriangle DEF$ are D(0,0), E(a,0), and F(0,b). Find the lengths of each side of the triangle. What kind of triangle is this (scalene, isosceles, or equilateral)?

24. The vertices of $\blacktriangle ABC$ are A(-a,0), B(a,0), and C(0,b). Find the lengths of the sides of the triangle. What kind of triangle is this (scalene, isosceles, or equilateral)?

25. Given Rectangle ABCD with vertices A(0,0), B(a,0), C(a,b), and D(0,b). Show that the diagonals are congruent.

26. Quadrilateral ABCD has vertices A(-a,0), B(a,0), C(a,b), and D(-a,b). Prove that ABCD is a rectangle.

27. Quadrilateral QRST has vertices Q(0,0), R(d,e), S(d,e+f), and T(0,f). Show that QRST is a parallelogram.

28. The vertices of RSTV are R(0,0), S(a,0), T(a+b,c), and V(b,c).

   d. Find the slopes of $\overline{RV}$ and $\overline{ST}$.
   e. Find the lengths RV and ST.
   f. Show that RSTV is a parallelogram (one pair opp. sides $||$ and $\cong$)

29. The vertices of quadrilateral ABCD are A(0,0), B(r,s), C(r,s+t), and D(0,t).

   d. Represent the slopes of $\overline{AB}$ and $\overline{CD}$.
   e. Represent the lengths of AB and CD.
   f. Show that ABCD is a parallelogram.

30. The vertices of ABCD are A(0,0), B(a,0), C(a,b), and D(0,b).

   d. Show that ABCD is a parallelogram.
   e. Show the diagonals are congruent ($\overline{AC} \cong \overline{BD}$).
   f. Show that ABCD is a rectangle.

31. The vertices of GAME are G(r,s), A(0,0), M(t,0), and E(t+r,s). Prove that GAME is a parallelogram.

32. Given Rhombus ABCD with vertices A(0,0), B(a,0), C(a+b,c), and D(b,c). Prove that the diagonals of a rhombus are perpendicular ($\overline{AC} \perp \overline{BD}$).

33. Quadrilateral ABCD has coordinates A(0,0), B(6a,3b), C(3a,4b), and D(a,3b) with $a \neq 0$ and $b \neq 0$.

   d. Show that $\overline{AB} \,||\, \overline{CD}$.
   e. Show that $\overline{AD}$ is not parallel to $\overline{BC}$.
   f. Which kind of quadrilateral is ABCD and WHY?

Linear Systems | Name ______________________________
Geometry | Date ______________ Block ___________

Solve the following system of linear equations **graphically**.

1. $\begin{cases} y = x \\ y = 6 - x \end{cases}$

2. $\begin{cases} y = -x \\ y = x + 9 \end{cases}$

3. $\begin{cases} y = -x + 2 \\ y = 2x + 5 \end{cases}$

4. $\begin{cases} y = 3x + 1 \\ y = 3x - 8 \end{cases}$

5. $\begin{cases} x - y = 6 \\ 2x + y = 0 \end{cases}$

6. $\begin{cases} 4x + y = -3 \\ 5x - y = -6 \end{cases}$

7. $\begin{cases} 3x - 9y = 0 \\ -x + 3y = -3 \end{cases}$

8. $\begin{cases} -2x + y = -1 \\ x + y = 5 \end{cases}$

9. $\begin{cases} y = \dfrac{1}{2}x + 1 \\ 4x - 8y = -8 \end{cases}$

10. $\begin{cases} 2y - x = 2 \\ x - 2y = 8 \end{cases}$

11. $\begin{cases} y - 2x = -5 \\ y - x = -3 \end{cases}$

12. $\begin{cases} 6x + 4y = 2 \\ 3x + 2y = 1 \end{cases}$

Graphing Parabolas & Circles WS
Geometry

Name ___________________________
Date ____________ Block _________

I) Graph each parabola and provide a table of values. Be sure to label your graph!

1. $y = x^2 - 4x + 6$

2. $y = x^2 + 6x + 8$

3. $y = -x^2 + 10x - 20$

4. $y = -x^2 - 6x - 8$

5. $y = 2x^2 + 4x - 1$

6. $y = x^2 + 2x$

II) Find the center and the radius of the circle. Graph using a compass if you have one..... Be sure to label your graphs!

7. $x^2 + y^2 = 25$

8. $(x-2)^2 + (y+1)^2 = 16$

9. $(x+3)^2 + (y-4)^2 = 4$

10. $x^2 + (y+1)^2 = 10$

11. $(x-2)^2 + y^2 = 21$

12. $(x+3)^2 + (y+3)^2 = 20$

Solve Systems Graphically WS
Geometry
[Parabolas, Circles, Lines]

Name ________________________
Date __________ Block _______

Solve the following system of equations **graphically**. Show all work necessary and check your answers.

1. $\begin{cases} y = x^2 + 2x + 1 \\ y = 2x + 5 \end{cases}$

2. $\begin{cases} y = x^2 - 3x + 2 \\ y = x - 1 \end{cases}$

3. $\begin{cases} y = x^2 + 2x - 1 \\ y = x + 1 \end{cases}$

4. $\begin{cases} y = x^2 + 1 \\ 2x - y = -4 \end{cases}$

5. $\begin{cases} y = x^2 - 3x - 10 \\ 3x - y = 19 \end{cases}$

6. $\begin{cases} 2y = x^2 - 8x + 7 \\ x - y = 7 \end{cases}$

7. $\begin{cases} y = -x^2 + x - 5 \\ 2y - x = 4 \end{cases}$

8. $\begin{cases} x^2 + y^2 = 8 \\ y = x \end{cases}$

9. $\begin{cases} x^2 + y^2 = 32 \\ x + y = 0 \end{cases}$

10. $\begin{cases} x^2 + y^2 = 25 \\ x + y = 8 \end{cases}$

11. $\begin{cases} x^2 + y^2 = 8 \\ y + 4 = x \end{cases}$

12. $\begin{cases} x^2 + y^2 = 18 \\ y = 6 - x \end{cases}$

13. $\begin{cases} y = x^2 \\ y = 8 - x^2 \end{cases}$

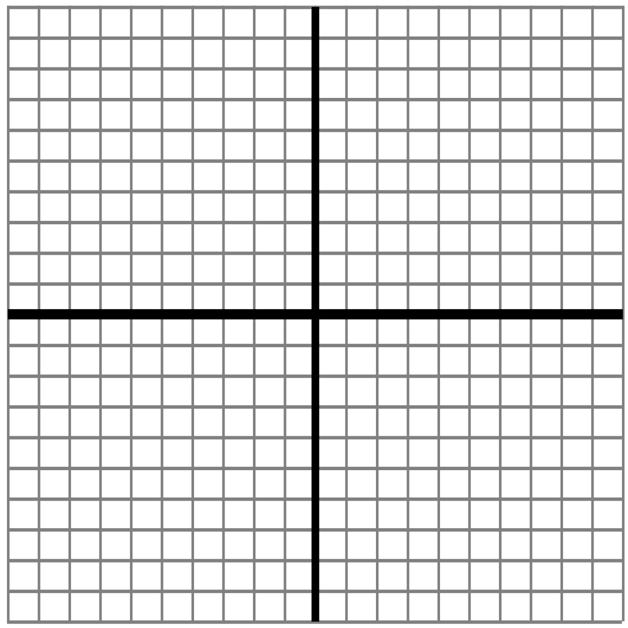
14. $\begin{cases} y = x^2 - 2x \\ y = -x^2 + 6x - 6 \end{cases}$

Circle systems extra practice
Geometry

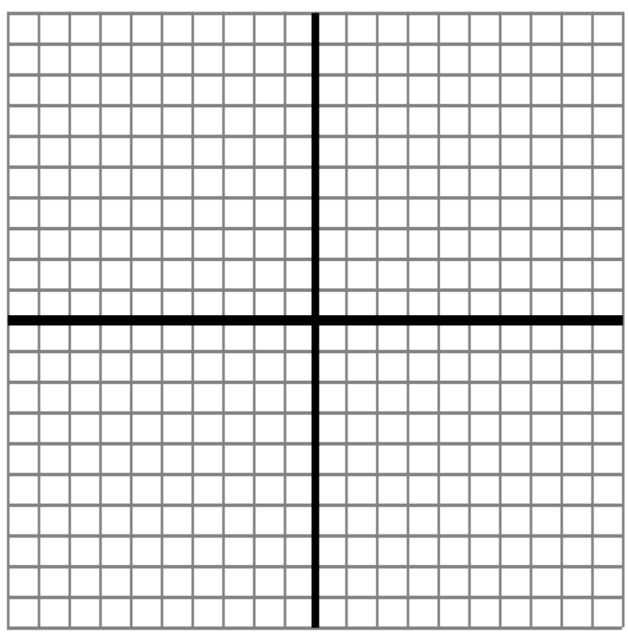
Name ______________________________
Date ____________ Block ________

Solve the following system of equations graphically and check.

1) $\begin{cases} (x+4)^2+(y-2)^2=25 \\ x+2y=10 \end{cases}$

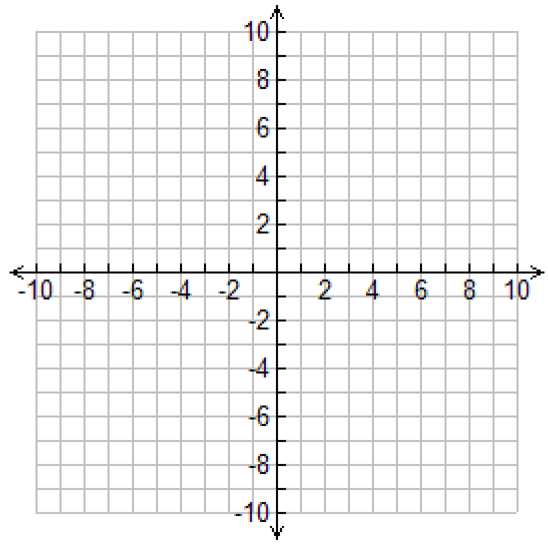


2) $\begin{cases} (x+2)^2+(y+1)^2=4 \\ y-x=-1 \end{cases}$

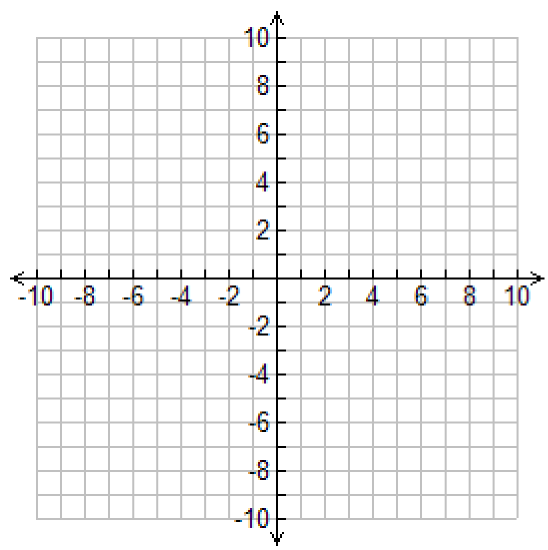


Review Coordinate Geometry

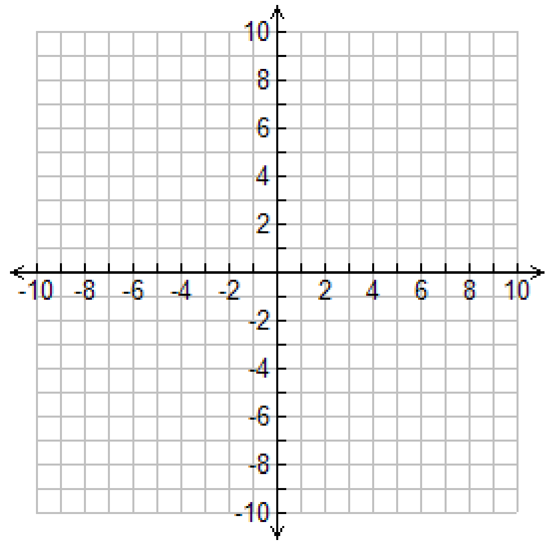
1. The coordinates of the vertices of quadrilateral ABCD are A(4, 1), B(1, 5), C(-3, 2), and D(0,-2). Prove the quadrilateral is a square.



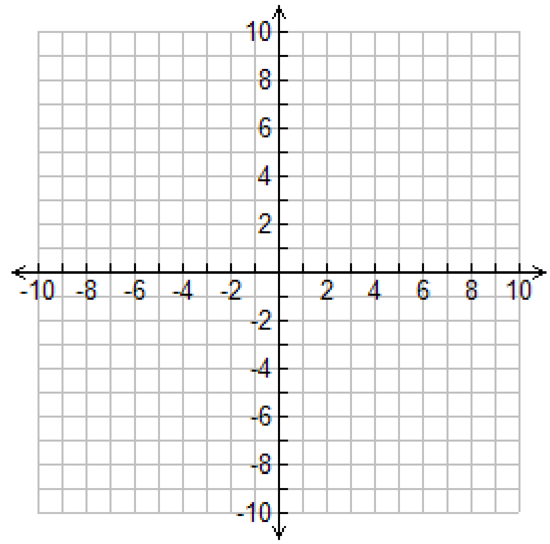
2. The coordinates of the vertices of ΔXYZ are X(1,1), Y(12, -1), and Z(9, 5).
   a. Prove that ΔXYZ is a right triangle.
   b. Find the area of ΔXYZ.



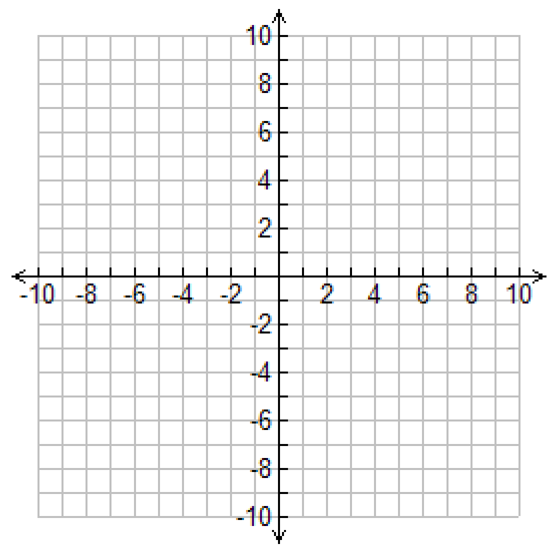
3. Quadrilateral ABCD has vertices A(-3, -2), B(9, 2), C(1, 6), and D(-5, 4). Using coordinate geometry, prove that quadrilateral ABCD is a trapezoid and contains a right angle.



4. Quadrilateral JAME has vertices J(2, -2), A(8, -1), M(9, 3), and E(3, 2).
   a. Prove that JAME is a parallelogram.
   b. Prove that JAME is not a rectangle.



5. The vertices of parallelogram ABCD are A(2, 4), B(0, 0), C(6, 2), and D(8, 6). Find the coordinates of the intersection of the diagonals.



Name: ____ *Geometry*
Chapter 13 Review

1. The coordinates of the midpoint of segment AB are (-7, 6). If the coordinates of point A are (2, -4) and the coordinates of B are (-16, y), what is the value of y?

2. The coordinates of A and B are (2a, 4b) and (8a, 6b), respectively. Express in terms of a and b, the coordinates of the midpoint of segment AB.

3. Write an equation of the line that passes through points (2, 3) and (4, 5).

4. What is the length of the line segments joining points J(1, 5) and K(3, 9) in simplest radical form.

5. Find the slope of the lines 6x + 3y = 10 and y = -2x + 5. What can you conclude about these lines?

6. Give an equation of the perpendicular bisector of the segment joining (5, 1) and (-3, 7).

7. Refer to the points $A(6,-6)$, $B(2,1)$, $C(-6,2)$ and $D(-2,-5)$. Use slopes to show that $\overline{AC} \perp \overline{BD}$.

8. Find the center and radius of the circle with equation $(x-4)^2+(y+7)^2=\frac{1}{25}$.

9. Write the equation of a circle whose center is (-2, 0) and has a radius of $\sqrt{11}$.

10. Sketch the graph of $(x-3)^2+(y+2)^2=36$.

11. Show that triangle with vertices A(-3, 4), M(3, 1) and Y(0, -2) is isosceles.

12. Write the equation of a circle that has center (-2, -4) and passes through the point (3, 8).

13. Given ΔSTR is an isosceles triangle with $TS = TR$, $S(2a, 2b)$ and $T(0,0)$.

    a. Find the coordinates of R.

    b. Find the coordinates of the midsegment parallel to $\overline{TR}$.

14. Quadrilateral MNOP has coordinates $M(-3,1)$, $N(1,-2)$, $O(-2,-6)$ and $P(-6,-3)$. Show the diagonals::

    a. are congruent.

    b. are perpendicular.

    c. have the same midpoint.

    d. Give the best name for MNOP___________________________

15. Quadrilateral QRST has vertices $Q(-2,3)$, $R(1,5)$, $S(5,-1)$ and $T(2,-3)$.

    a. Show QRST is a parallelogram.

    b. Determine what "special" kind of parallelogram is QRST? Justify your answer.

16. Quadrilateral WXYZ has vertices $W(a,0)$, $X(0,0)$, $Y(b,c)$ and $Z(a-b,c)$. Show that WXYZ is an isosceles trapezoid.

17. Quadrilateral LMNO has vertices $L(-6,1)$, $M(1,1)$, $N(1,8)$ and $O(-6,8)$.

    a. Show the diagonals bisect each other.
    b. Give the best name for LMNO___________________________