EOC Warm-up

Monday 4/15

Coordinate Geometry

1. What is the center and radius of the circle given by $8x^2 + 8y^2 - 16x - 32y + 24 = 0$?

$\frac{}{8}\ \frac{}{8}\ \frac{}{8}\ \frac{}{8}\ \frac{}{8}\ \frac{}{8}$

$x^2-2x+\underline{1}+y^2-4y+\underline{4}=-3+\underline{1}+\underline{4}$

$\left(\frac{-2}{2}\right)^2=1 \quad \left(\frac{-4}{2}\right)^2=4$

$(x-1)^2+(y-2)^2=2$

Center $(1,2)$ $\quad r^2$

$r=\sqrt{2}\approx 1.4 \quad \sqrt{r^2}=\sqrt{2}$

Coordinate Geometry

2. The line p is represented by the equation $y = 4x + 1$. What is the equation of the line that is perpendicular to line p and passes through the point $(8, 5)$?

$m=-\frac{1}{4}$

$(8,5)$

$y=mx+b$

$5=-\frac{1}{4}(8)+b$

$5=-2+b$

$+2 \quad +2$

$7=b$

$y=-\frac{1}{4}x+7$

Homework Answers

① $c = 9$
$(x-3)^2$

② 16
$(x+4)^2$

③ $c = \frac{49}{4} = 12.25$
$(x-3.5)^2$

④ $(x-5)^2 = 20$

⑤ $x^2+6x=-8$
$(x+3)^2=1$

⑥ $x^2-2x=7/3$
$(x-1)^2=4.3$

⑦ $(x+1)^2+(y-5)^2=16$
$C(-1,5)$
$R=4$

⑧ $(x-2)^2+(y+3)^2=4$
$C(2,-3)$
$r=2$

⑨ $(x-5)^2+(y-6)^2=21$
$C=(5,6)$
$r=\sqrt{21}\approx 4.6$

⑩ $x^2+y^2-4x+2y=-1$
$(x-2)^2+(y+1)^2=4$
$C=(2,-1)$
$r=2$

⑪ $x^2+y^2-4y+2=0$
$x^2+(y-2)^2=2$
$C=(0,2)$
$r=\sqrt{2}\approx 1.7$

⑫ $x^2+y^2+6x+2y=0$
$(x+3)^2+(y+1)^2=10$
$C=(-3,-1)$
$r=\sqrt{10}\approx 3.1$

Quick Check

COORDINATE APPLICATIONS

Distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ Midpoint Formula: $\left(\frac{(x_1 + x_2)}{2}, \frac{(y_1 + y_2)}{2}\right)$

Slope Formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$ Recall: 2 lines are parallel if their slopes are ==

2 lines are ⊥ if their slopes are negative reciprocals

Equation of a line: Slope Intercept form y = mx + b

Coordinate Geometry Applications:

To Prove a Quadrilateral is:	Prove the following	Formulas used
Parallelogram **(Use only one of these four methods)**	1. both pairs of opposite sides are parallel	1. use slope formula
	2. both pairs of opposite sides are congruent	2. distance formula
	3. one pair of opposite sides are parallel **and** congruent	3. slope and distance formula
	4. diagonals bisect each other	4. midpoint formula
Rectangle	1. Find the slope of all 4 sides. First show it's a parallelogram because opposite sides are parallel and then prove it's a rectangle by showing it's a parallelogram with right angles.	1. Slope formula
Rhombus	1. Show all sides are congruent	1. distance formula
Square **(must show both!!!)**	1.Show all 4 sides are congruent (showing it's a parallelogram and rhombus) 2. Show diagonals are congruent	1. distance formula 2. distance formula
Trapezoid	1.Show 1 pair of sides are parallel 2.Show the other sides are not parallel	1. MUST FIND SLOPE OF **ALL** 4 SIDES
Isosceles Trapezoid **(must show both)**	1.Prove it's a trapezoid 2. Show non parallel sides congruent	1. Find slope of all 4 sides 2. distance formula
Right Trapezoid **(must show both)**	1. Prove it's a trapezoid 2. Show one set of sides are perpendicular.	1. Slope formula 2. Slope formula (2 consecutive sides have slopes that are negative reciprocals).

Coordinate Geometry Applications Practice

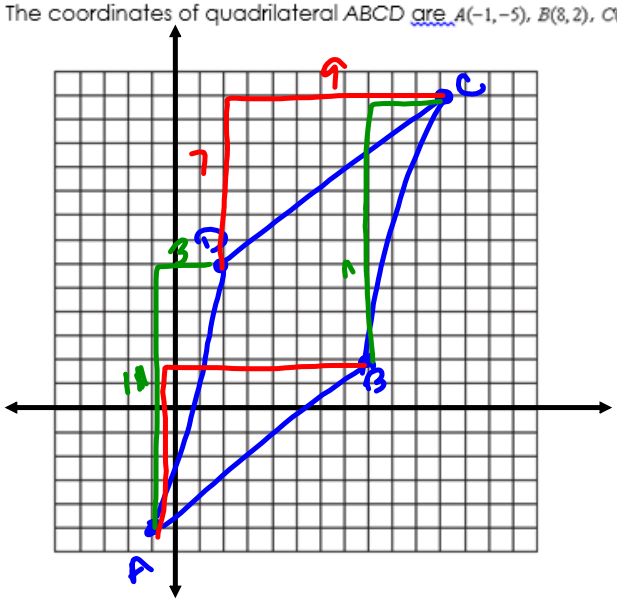
(you may have to use a separate sheets of paper for this – you'll need lots of room for some)

Tips for doing Coordinate Geometry Applications:

1. **Organize** your work and **label everything**. Do not just perform calculations all over the place and leave your teacher to figuring out what is what (because we won't!).
2. label your algebra statements clearly
   - so, for example, if you're going to show the figure on the next page is a parallelogram by definition, one thing you'll need to do is find the slope of $\overline{BC}$. When you show that, write something like $slope\overline{BC} = \frac{3-0}{-4-8} = \frac{3}{-12} = \frac{-1}{4}$.
3. do **NOT** turn nice fractions like ¾ into decimals – simplify all fractions
4. you must **show algebraic work** for things in your proofs – you can not just simply, for example, look at the graph paper and write down the pt. where it looks like 2 lines intersect – you must use some algebraic way to find the point

Example 1: Determine the type of quadrilateral that is graphed below. *You must clearly state your reasoning and show mathematical evidence to support your answer.*

The coordinates of quadrilateral ABCD are $A(-1,-5)$, $B(8,2)$, $C(11,13)$, and $D(2,6)$.



Slope

$AD = \frac{11}{3}$

$BC = \frac{11}{3}$

$DC = \frac{7}{9}$

$AB = \frac{7}{9}$

$AD^2 = 11^2 + 3^2$

$AD^2 = 121 + 9$

$AD = \sqrt{130}$

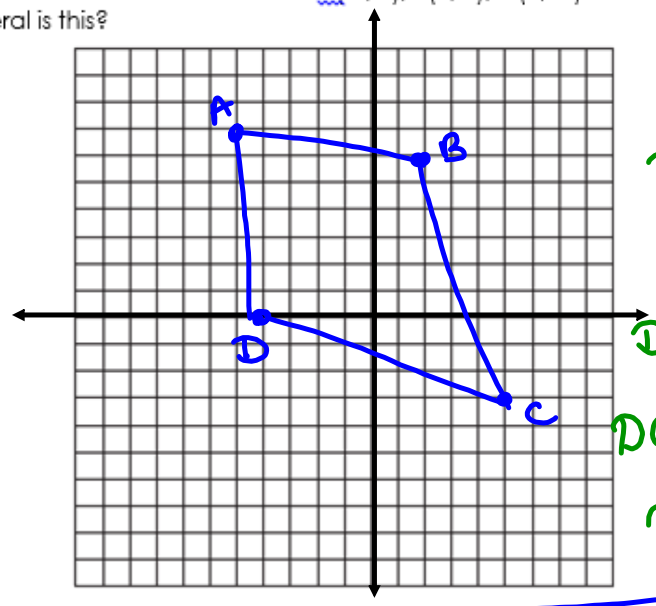
$DC^2 = 7^2 + 9^2$

$DC^2 = 49 + 81$

$DC = \sqrt{130}$

The figure is a rhombus, b/c opposite sides are parallel and consecutive sides are congruents.

Example 2
A quadrilateral has vertices with coordinates A(-5, 7), B(2, 6), C(5, -3) and D (-4, 0) Which type of quadrilateral is this?



$BC = \sqrt{(2-5)^2+(6--3)^2}$

$BC = \sqrt{9+81}$

$BC = \sqrt{90}$

$DC = \sqrt{(+5--4)^2+(-3-0)^2}$

$DC = \sqrt{81+9}$

$DC = \sqrt{90}$

Distance

$AB = \sqrt{(-5-2)^2+(7-6)^2}$

$AB = \sqrt{49+1}$

$AB = \sqrt{50}$

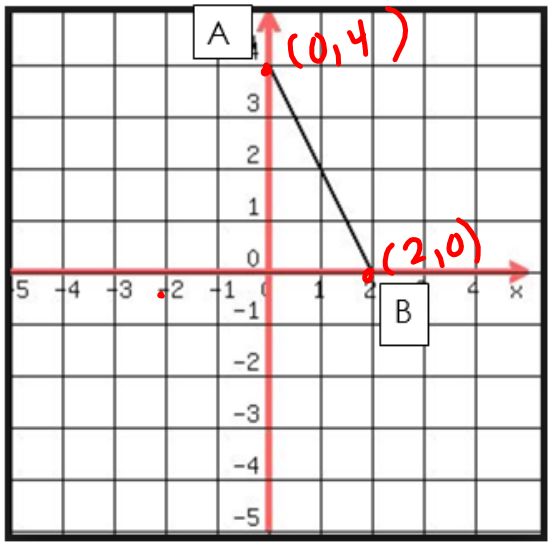
$AD = \sqrt{(-4--5)^2+(0-7)^2}$

$AD = \sqrt{1+49}$

$AD = \sqrt{50}$

This figure is a kite b/c consecutive sides are congruent but not all sides.

Example 3
If points A and B below are two vertices of an **equilateral** triangle, what is the **perimeter** of the triangle?



$D = \sqrt{(2-0)^2+(0-4)^2}$

$D = \sqrt{4+16}$

$D = \sqrt{20}$

$D = 4.5$

$P = 4.5 + 4.5 + 4.5$

$P = 3(4.5)$

$P = 13.5$