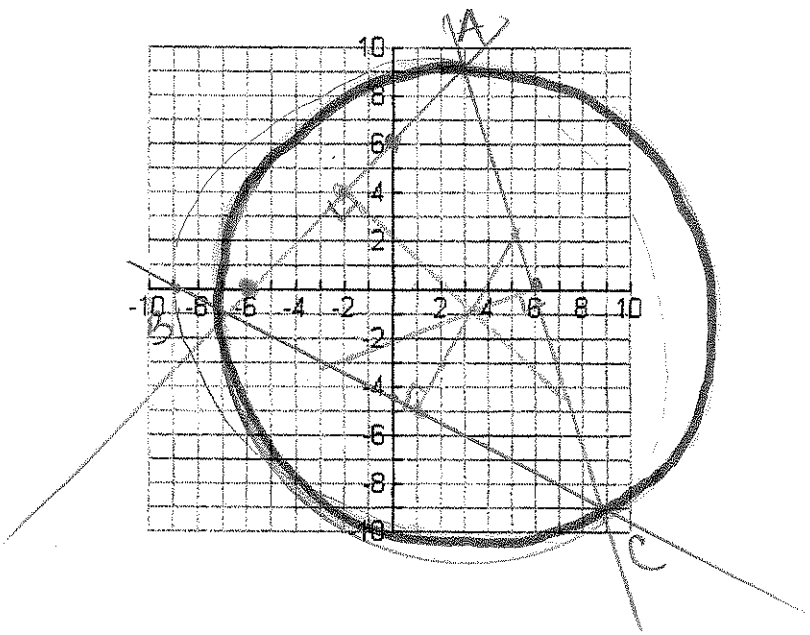
Equations of Circles and Lines Name_____

Graph the following lines:



AB $y = x + 6$

BC $2y = -x - 9$

AC $3x + y = 18$

2. Find the points of intersection of the three lines (points A, B, C)

A(3,9) C)(9,-9)
B(-7,-1)

3. Find the midpoints of AB, BC and AC and graph the points

midpoint (-2,4) midpoint (6,0)
midpoint (1,-5)

4. Write the equations of the perpendicular bisectors of segments, AB, BC, and AC and draw those lines on the graph

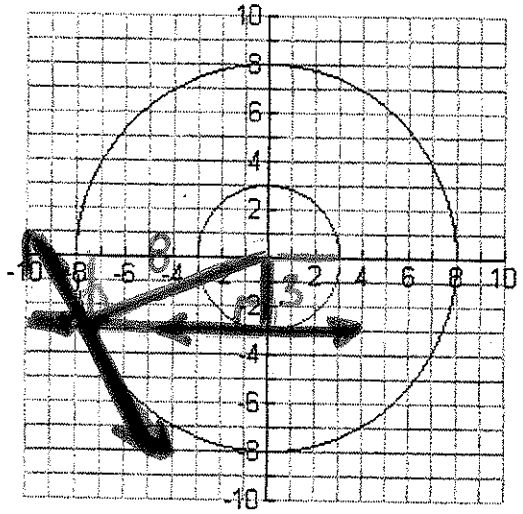
$\perp$ AB: $y - 4 = -1(x+2) \Rightarrow y = -1(x+2)+4$
$\perp$ BC: $y+5 = 2(x-1)$
$\perp$ AC: $y = \frac{1}{3}(x-6)$

5. Find the point of intersection of the three perpendicular bisectors in #4

(3,-1)
ORTHOCENTER

6. Using the intersection point in #5 as a center, and point A as a point on the circle, write the equation of that circle and graph. What do you notice?

7. A. Write the equations of these concentric circles:



$x^2+y^2=9$

$x^2+y^2=64$

B. Find the coordinates of the point on the negative y axis where the circle with radius 3 crosses.

$(0,-3)$

C. Write the equation of the tangent line to the circle with radius 3 at the point in part B

$y=-3$

D. Find the coordinates of the point where the tangent line in C intersects the circle with radius 8 in the **third quadrant** $(-\sqrt{55},-3)$

$\sqrt{64-9}$

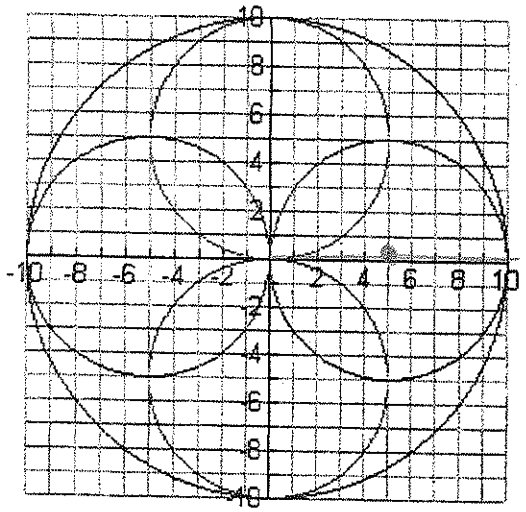
E. Write the equation of the tangent line to the circle with radius 8 at the point in part D

m of radius $=\frac{3}{\sqrt{55}}$

$\perp m=-\frac{\sqrt{55}}{3}$

$y+3=-\frac{\sqrt{55}}{3}(x+\sqrt{55})$

8. Write the equations of these circles.



$x^2+y^2=100$

$(x-5)^2+y^2=25$ RIGHT

$(x+5)^2+y^2=25$ LEFT

$x^2+(y+5)^2=25$ DOWN

$x^2+(y-5)^2=25$ UP

Write the five equations if the design was translated to (-5,7)

STUDENTS WILL ANSWER