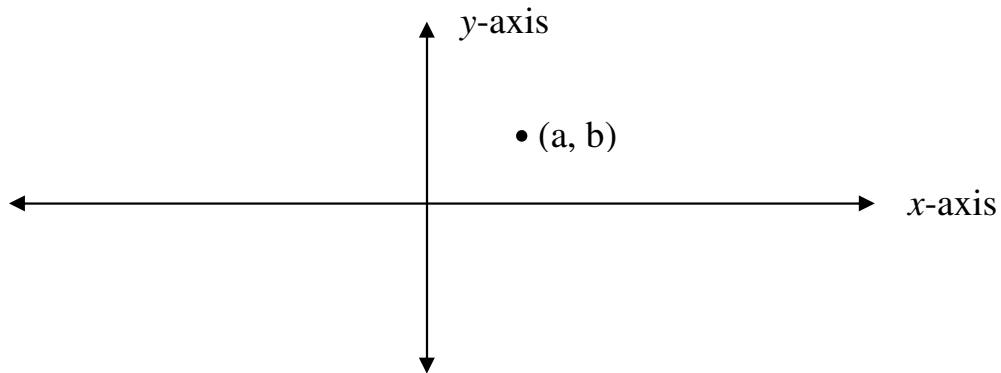


## LESSON 2: ELEMENTARY ANALYTIC GEOMETRY

- Objectives:
1. To review the Cartesian coordinate plane
  2. To derive and use the distance formula
  3. To define and use the midpoint formula
  4. To derive and use the equation of a circle

### The Cartesian Coordinate Plane



### The Distance Formula

The distance  $d$  between points  $A(x_1, y_1)$  and  $B(x_2, y_2)$  is given by

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

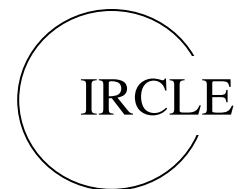
### Midpoint Formula

The midpoint of  $\overline{AB}$  where  $A(x_1, y_1)$  and  $B(x_2, y_2)$  is the average

$$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

### Equation of a Circle

Given center  $(h, k)$  and radius  $r$ ,  $(x - h)^2 + (y - k)^2 = r^2$



## Problems

1. Find  $d(A, B)$  if  $A = (-5, 1)$  and  $B(-2, -3)$ ..
2. Show the triangle  $ABC$  is a right triangle given  $A(6, -7)$ ,  $B(11, -3)$  and  $C(2, -2)$ .
3. State the equation of the circle with center  $(-3, 2)$  and radius 4.
4. Describe the set of points defined by:
  - a.  $x^2 + y^2 - 2x + 10y + 19 = 0$
  - b.  $x^2 + y^2 - 2x + 10y + 30 = 0$
  - c.  $2x^2 + 2y^2 - 8x + 12y + 26 = 0$

