Standard Form of the Equation of a Circle

The point (x,y) lies on the circle of radius r and center (h,k) if and only if;

$$(x-h)^2+(y-k)^2=r^2$$

Ex. 1: $x^2+y^2=16$ is a circle with its center at the $(0,0)$ and radius of 4

Ex. 2: If h = 3, k = -2 and r = 4, give the equation of the circle:

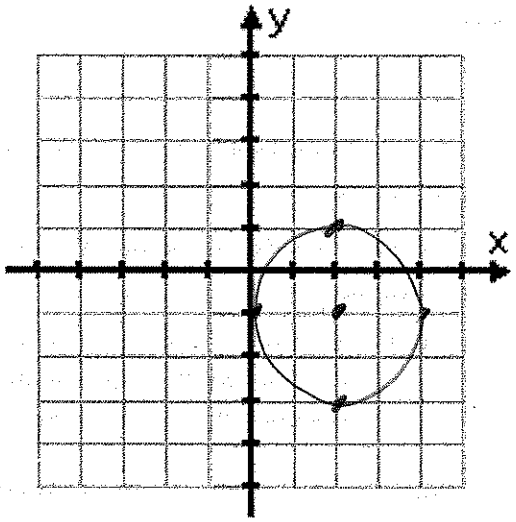
$(x-3)^2+(y+2)^2=16$

Ex. 3: $(x-2)^2+(y+1)^2=4$ is a circle

with its center at $(2,-1)$

and radius of 2

Now sketch a graph!



Using your graph, determine

What is the domain of $(x-2)^2+(y+1)^2=4$?

$[0,4]$

What is the range of $(x-2)^2+(y+1)^2=4$?

$[-3,1]$

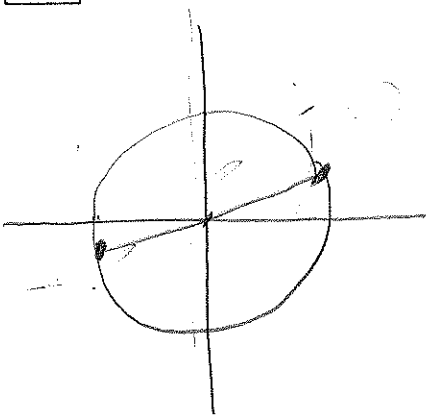
Ex. 4: The point (3,4) lies on a circle whose center is at (-1,2).
Write the standard form of the equation of this circle:

$r = \sqrt{(3--1)^2+(4-2)^2} = \sqrt{16+4} = \sqrt{20}$

∴ circle's equation is

$(x+1)^2+(y-2)^2 = 20$

Ex. 5: If the diameter of a circle has two endpoints of (-4,-1) and (4,1), write the equation of the circle:



midpt of segment is the center

midpt is $\left(\frac{-4+4}{2}, \frac{-1+1}{2}\right) = (0,0)$

∴ $h, k = 0$

$r = \sqrt{(4-0)^2+(1-0)^2} = \sqrt{16+1} = \sqrt{17}$

$x^2+y^2 = 17$