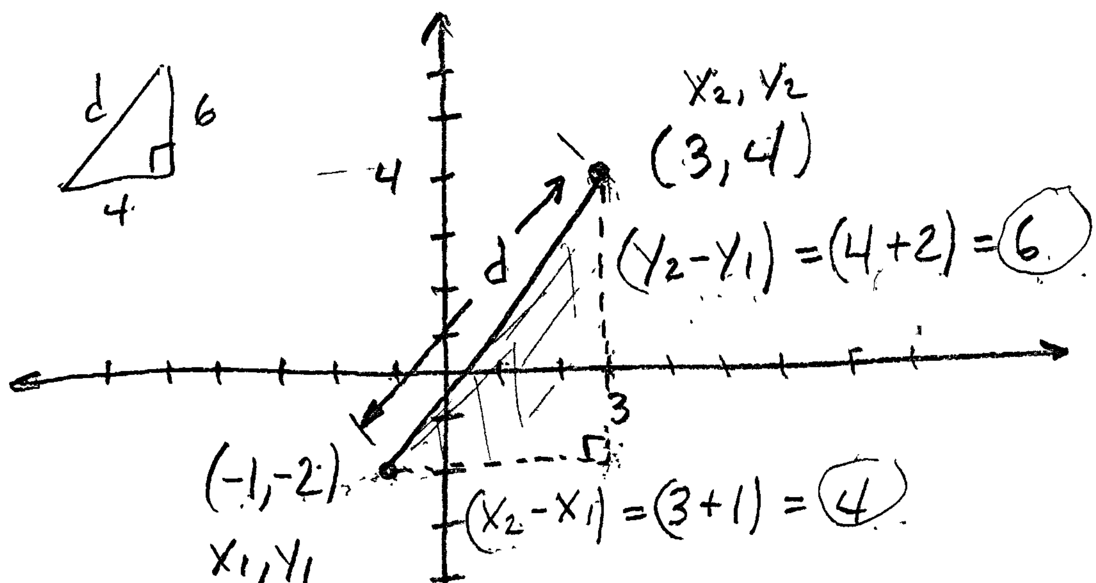
# Geometry — Monday 2-4-13 — Class Notes

## Ch. 12-7 Cirles in the Coordinate Plane

$\underbrace{\text{Coordinate Plane}}_{\text{XY Plane}}$

Recall the "distance formula" which is a direct result of the Pythagorean Theorem




$$d^2 = 4^2 + 6^2$$
$$d^2 = 16 + 36 = 52$$
$$d = \sqrt{52} = \sqrt{4}\sqrt{13}$$
$$\boxed{d = 2\sqrt{13} \text{ units}}$$

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

Let $C(h, k)$ be the KNOWN coordinates of the point C which is the Center of a circle.

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NOTE: $C(0, 0)$ is a circle centered at the origin so $C(h, k)$ represents a horizontal & vertical shift of the center

horizontal SHIFT

VERTICAL SHIFT

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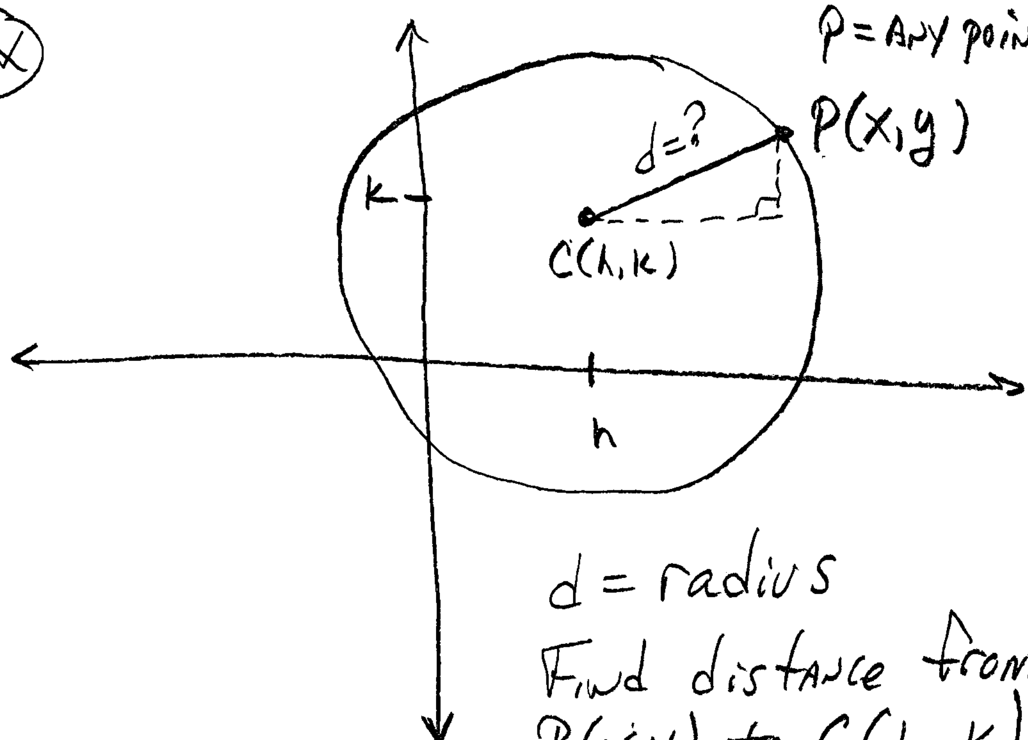
Ex

P = ANY POINT ON circle




d = radius

Find distance from $P(x, y)$ to $C(h, k)$

Ex A Write Equation

Pg 847 $\odot A$, Center $A(4,-2)$, radius $= 3$

B $\odot B$, passes through $(-2,6)$ with center $B(-6,3)$

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Ex A graph $x^2 + y^2 = 25$.

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B graph $(x+1)^2 + (y-2)^2 = 9$

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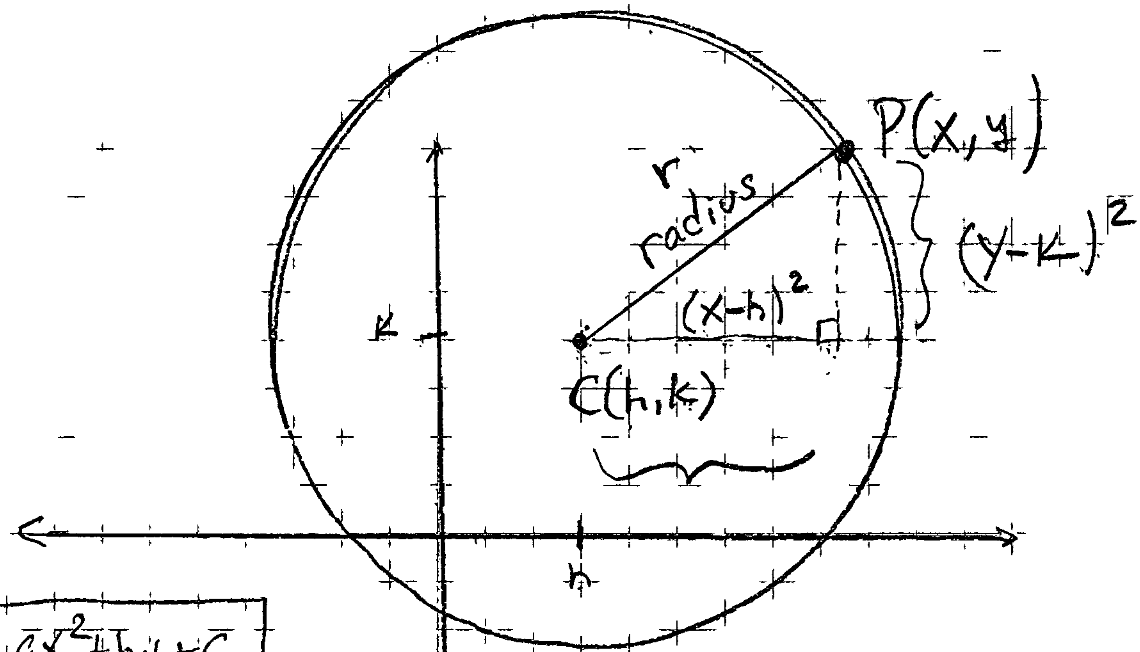
2a graph $x^2 + y^2 = 9$

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




STD form $\boxed{y = ax^2 + bx + c}$

Vertex form $\boxed{y = (x-h)^2 + k}$

Equation of Parabola

$$* \ \boxed{(x-h)^2 + (y-k)^2 = r^2}$$

Equation of Circle in x-y Coordinate Plane

$C(h, k)$, $r = \sqrt{r^2}$

$6\frac{1}{2} = \left(\frac{13}{2}\right)^2 = \frac{169}{4}$

EX $\quad x^2 + y^2 = r^2 \quad C(0, 0)$

EX $\quad (x-3)^2 + (y-4)^2 = (6.5)^2 = \frac{169}{4}$

$$\boxed{(x-3)^2 + (y-4)^2 = \frac{169}{4}}$$

$C(3, 4) \quad r = \sqrt{\frac{169}{4}}$

Eq of Circle above

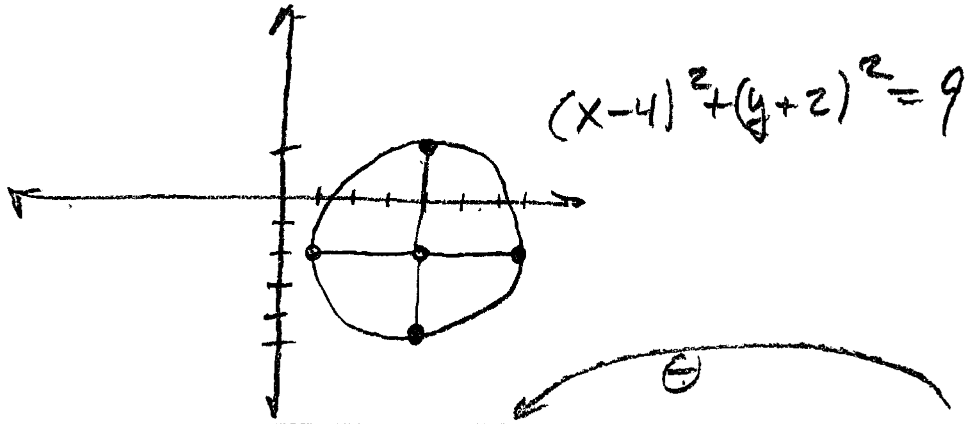
Write EOC

Ex A
pg 847

$\odot A$, $C(4,-2)$, radius $= 3$

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

$$\boxed{(x-4)^2+(y+2)^2=9}$$




$\ominus$

B $\odot B$ through $(-2,6)$, Center $(-6,3)$

h, k

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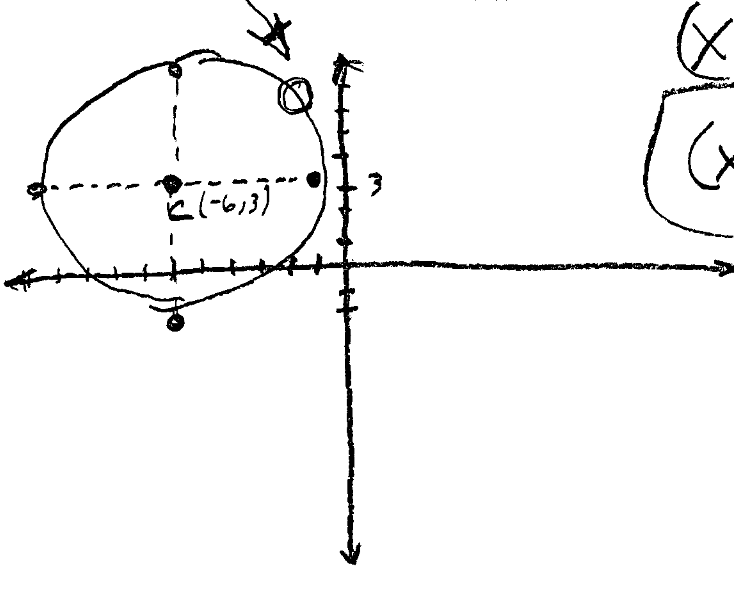
$$r^2=(3-6)^2+(-6+2)^2$$

$$r^2=(-3)^2+(-4)^2$$

$$r^2=9+16=25$$




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

$$\boxed{(x+6)^2+(y-3)^2=25}$$

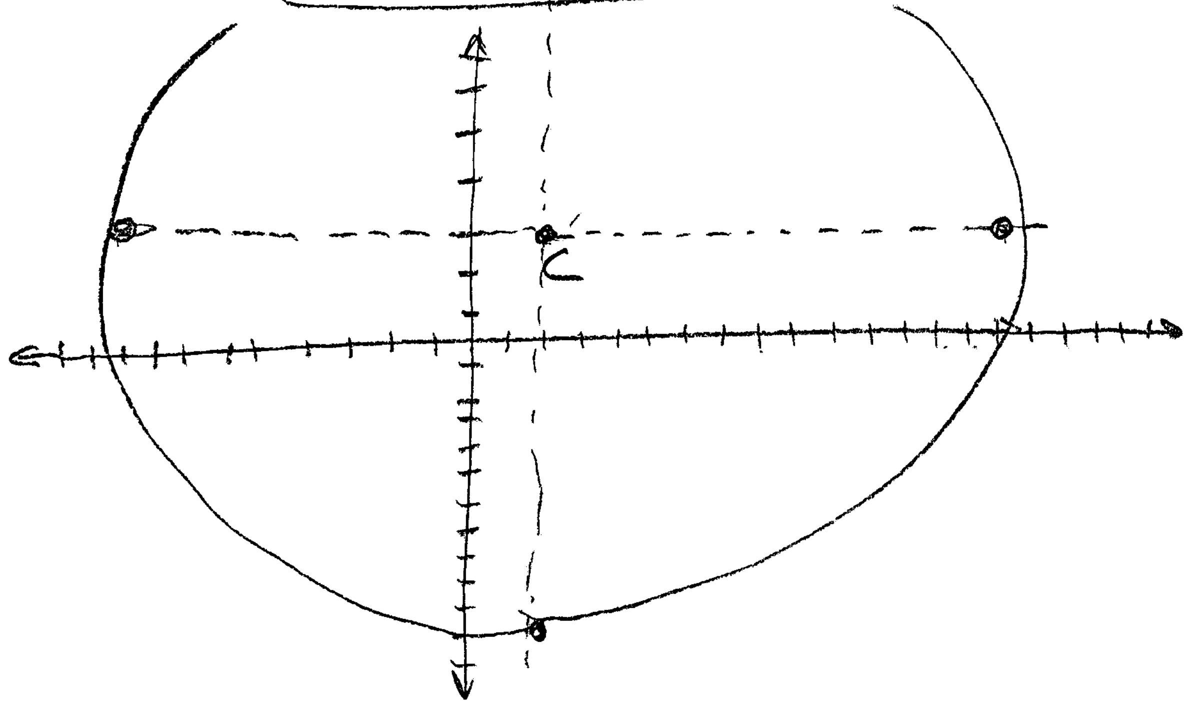
$C(-6,3)$, $r=5$

$h, k$

Ex $C(2, 3)$, $r = 15$

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

* $$\boxed{(x-2)^2 + (y-3)^2 = 225}$$




Ex $C(-5, 8)$ $r = \sqrt{12}$

$$(x+5)^2 + (y-8)^2 = 12$$

Ex $(x+6)^2 + (y+9)^2 = 25$

$$\boxed{C(-6, -9),\ r = 5}$$

Ex  ⊙B through $(-2, 6)$ } WRITE
Pg 847  Center AT $B(\underset{h}{-6}, \underset{k}{3})$ } Eq

$$r^2 = (6-3)^2 + (-2+6)^2$$

$$r^2 = 9 + 16 = 25$$

$$* \boxed{(x+6)^2 + (y-3)^2 = 25}$$

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Ex  $x^2 + y^2 = 18$

$C(0,0)$  $r = \sqrt{\underset{9 \cdot 2}{18}} = 3\sqrt{2}$

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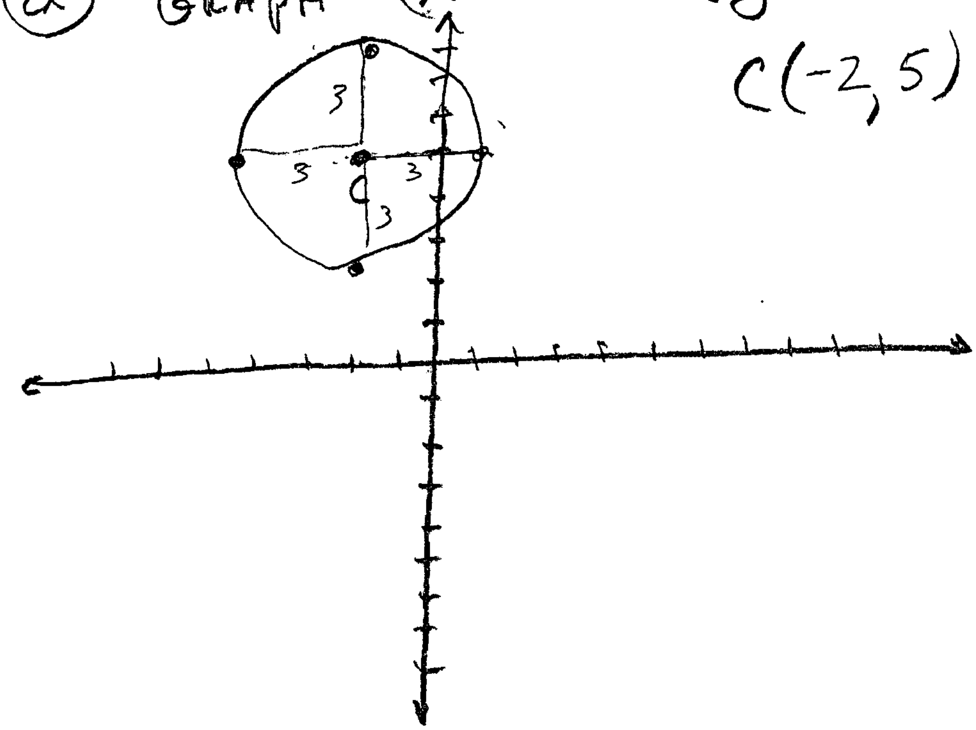
EOC $\Rightarrow \boxed{(x-h)^2 + (y-k)^2 = r^2}$

$C(h, k)$  $\sqrt{r^2} = r$

Ex GRAPH $(x+2)^2+(y-5)^2=9$

$C(-2,5)$ $r=3$




Ex GRAPH $(x+3)^2+y^2=16$

$C(-3,0)$ $r=4$