

BE-Alg. 2 Monday 3-15-10

ACT ① A circle in the standard (x, y) coordinate plane has an equation $(x-5)^2 + y^2 = 38$. What are the coordinates of the center of the circle and what is its radius?

② The coordinates of the endpoints of $\overline{CD}$ in the standard (x, y) coordinate plane are $(-4, -2)$ and $(14, 2)$. What is the x -coordinate of the midpoint of $\overline{CD}$?

Ans

① $(x-5)^2 + (y-0)^2 = 38$

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

$$\therefore C = (5, 0), r = \sqrt{38}$$

② Midpoint $\Rightarrow \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$ ② 19 ✓ simplified already

$$\therefore x \Rightarrow \frac{-4 + 14}{2} = \frac{10}{2} = 5 \Rightarrow (5, y)$$

↑
x

Recall: Ch 8-1 $\Rightarrow$ Distance & Midpoint Formulas

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

$\uparrow$ RUN $\uparrow$ RISE

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

Ch 8-2 $\Rightarrow$ PARABOLAS

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

STANDARD or
VERTEX or
h, k form

Where: $a > 0 \Rightarrow \curvearrowright$

$a < 0 \Rightarrow \curvearrowleft$

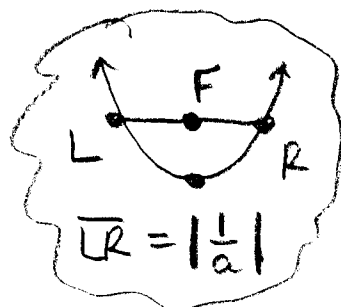
$V(h, k)$

$$\uparrow$$

$$\boxed{\text{AOS } x = h}$$

$$F(h, k + \frac{1}{4a})$$

$$\boxed{\text{directrix } y = k - \frac{1}{4a}}$$



Will use for
going from
graph to
Equation

$$\boxed{y = ax^2 + bx + c} \quad \text{General Form}$$

$$\text{AOS } \Rightarrow x = -\frac{b}{2a}$$

$$V\left[-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right]$$

Ch 8-3 $\Rightarrow$ Circles

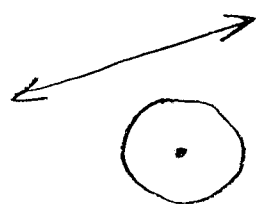
$$\boxed{(x - h)^2 + (y - k)^2 = r^2}$$

Standard
or
h, k form

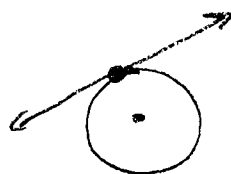
$$C(h, k) \quad r = \sqrt{r^2}$$

tangent line A line THAT TOUCHES A
CURVE AT ONLY 1 point.

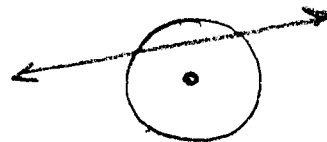
For A circle & A line in THE SAME plane, the line may intersect the circle in 0, 1, or 2 points. If it intersects at only 1 point the line must be tangent to the circle.



No intersection
(Zero)



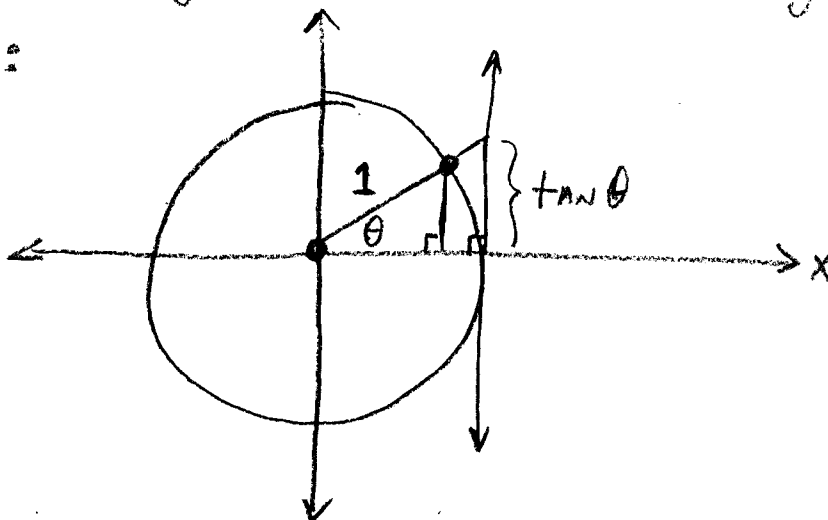
tangent
ONE intersection



2 intersections

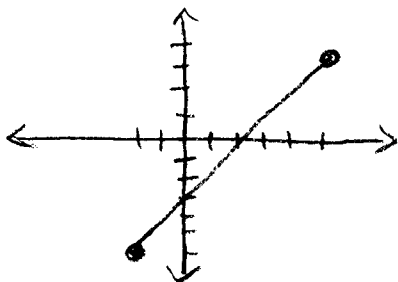
(FYI) Why is the trig. function called "tangent"?

Unit Circle:



Ex 2
Pg 427

Write the Equation of the circle with the endpoints of a diameter at $(5, 4)$, $(-2, -6)$



$$C(x, y) \Rightarrow \text{Midpoint} = \left(\frac{5-2}{2}, \frac{4-6}{2} \right) = \boxed{\left(\frac{3}{2}, -1 \right)}^C$$

$r = \text{distance from } \left(\frac{3}{2}, -1 \right) \text{ to } (5, 4)$

$$d = \sqrt{\left(\frac{10}{2} - \frac{3}{2} \right)^2 + (4+1)^2}$$

$$= \sqrt{\left(\frac{7}{2} \right)^2 + (5)^2} = \sqrt{\frac{49}{4} + \frac{100}{4}}$$

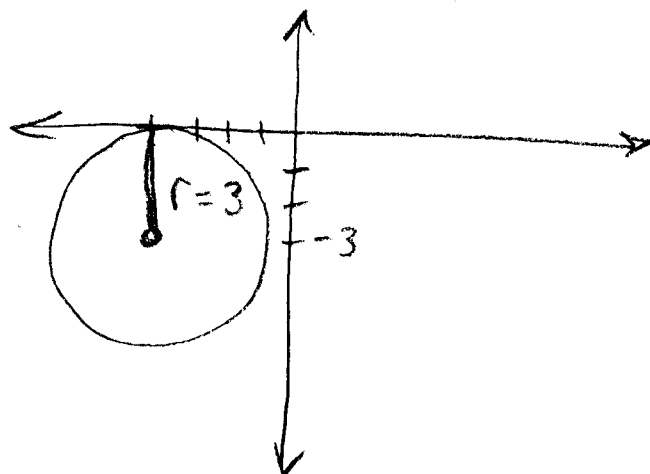
$$= \sqrt{\frac{149}{4}} = \boxed{\frac{\sqrt{149}}{2} = r} \quad \begin{matrix} 149 \\ ? \end{matrix}$$

$$\therefore r^2 = \left(\frac{\sqrt{149}}{2} \right)^2 = \frac{149}{4}$$

$$\therefore \boxed{\left(x - \frac{3}{2} \right)^2 + (y + 1)^2 = \frac{149}{4}}$$

EX 3
Pg 427

WRITE THE EOC WITH center
AT $(-4, -3)$ tangent to X-AXIS.



$$\therefore (x+4)^2 + (y+3)^2 = 9$$

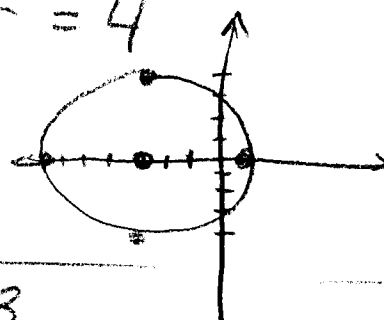
EX Graph $x^2 + y^2 + 6x - 7 = 0$

$$x^2 + 6x + 3^2 + (y+0)^2 = 7 + 9$$

$$\downarrow \quad \downarrow$$

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

$$\therefore C(-3, 0) \quad r = 4$$



Homework: Pg 429 #5-9, 12, 13.