BE-Alg. 2

Tuesday 3-13-12

ACT (2 min)

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 $(x-5)^2 + (y-0)^2 = 38$

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

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

(2) (19) ✓ simplified already

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

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

x

Recall: Ch 8-1 ⇒ Distance & Midpoint Formulas

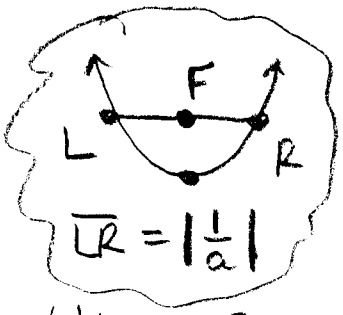
$$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$$ (run, rise)

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

Ch 8-2 ⇒ Parabolas

$$y = a(x-h)^2 + k$$ Standard or Vertex or h, k form

Where: $a > 0 \Rightarrow$ ☺ $a < 0 \Rightarrow$ ☹



$\overline{LR} = \left|\frac{1}{a}\right|$

Will use for going from graph to equation

$V(h, k)$

AOS $x = h$

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

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

$y = ax^2 + bx + c$ General Form

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

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

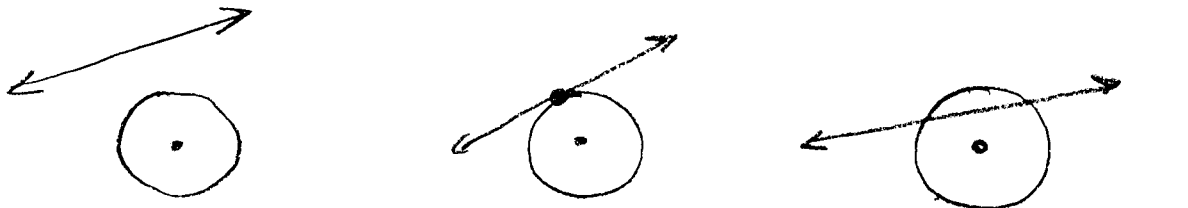
Ch-8-3 ⇒ Circles

$$(x-h)^2 + (y-k)^2 = r^2$$ Standard or h, k form

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

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 (cross) the circle in 0, 1, or 2 points. If it intersects at only 1 point the line must be tangent to the circle.

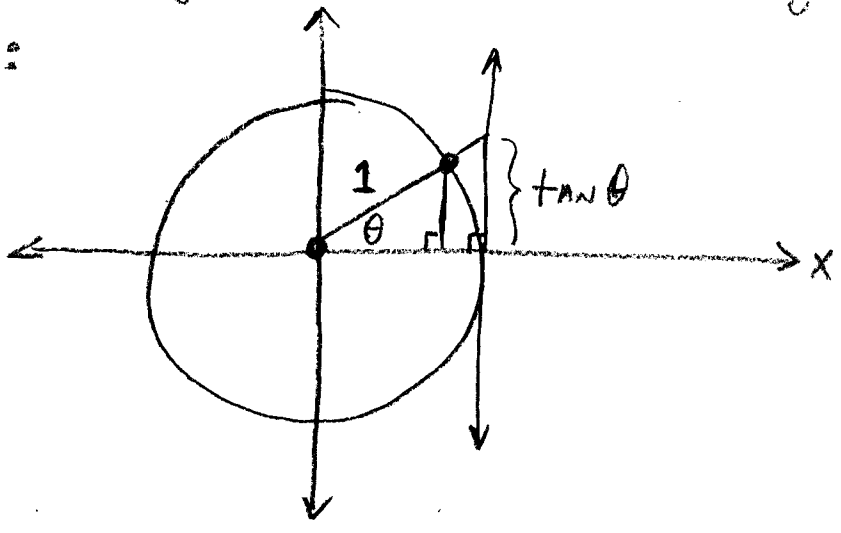


No intersection (Zero) | tangent ONE INTERSECTION | 2 intersections

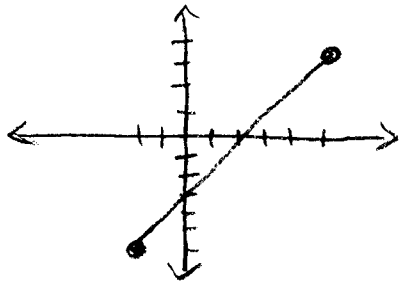
---

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 $(5,4), (-2,-6)$



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

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

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

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

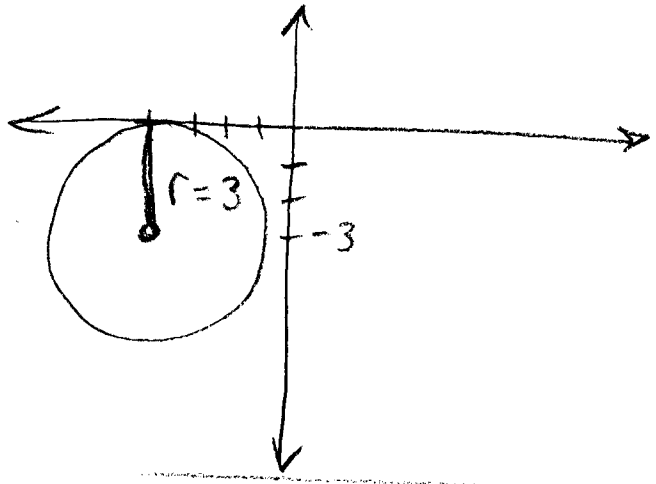
$$= \sqrt{\frac{149}{4}} = \boxed{\frac{\sqrt{149}}{2} = r}$$

149 ? ?

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

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

Ex 3 Pg 427 Write the EOC with center at $(-4,-3)$ tangent to X-axis.



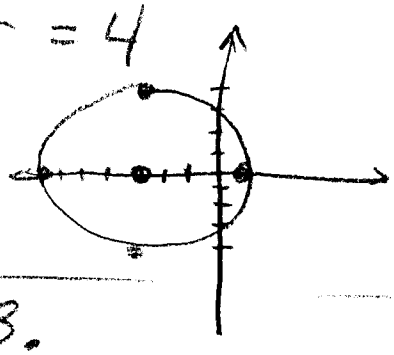
$\therefore \boxed{(x+4)^2+(y+3)^2=9}$

(Ex) Graph $x^2+y^2+6x-7=0$

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

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

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



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