

BE-Alg. 2 Thursday 3-17-11

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

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

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

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

$$d = \sqrt{\underbrace{(x_2 - x_1)^2}_{\text{Run}} + \underbrace{(y_2 - y_1)^2}_{\text{Rise}}}$$

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

Ch 8-2 \Rightarrow PARABOLAS

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

STANDARD or
VERTEX or
h, k form

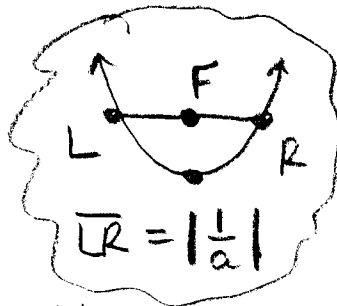
Where: $a > 0 \Rightarrow \text{smiley}$
 $a < 0 \Rightarrow \text{frowny}$

$$V(h, k)$$

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

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

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



Will use for
going from
graph to
Equation

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

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

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

Ch 8-3 \Rightarrow Circles

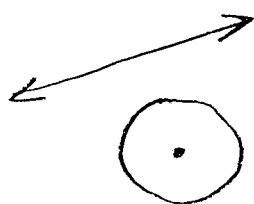
$$(x-h)^2 + (y-k)^2 = r^2$$

Standard
or
h, k form

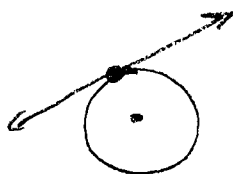
$$C(h, k) \quad r = \sqrt{r^2}$$

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

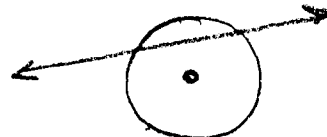
For A circle & A line in THE SAME plane, the line may intersect the circle in 0, 1, or 2 points. If it intersects at only 1 point the line must be tangent to the circle.



No intersection (Zero)



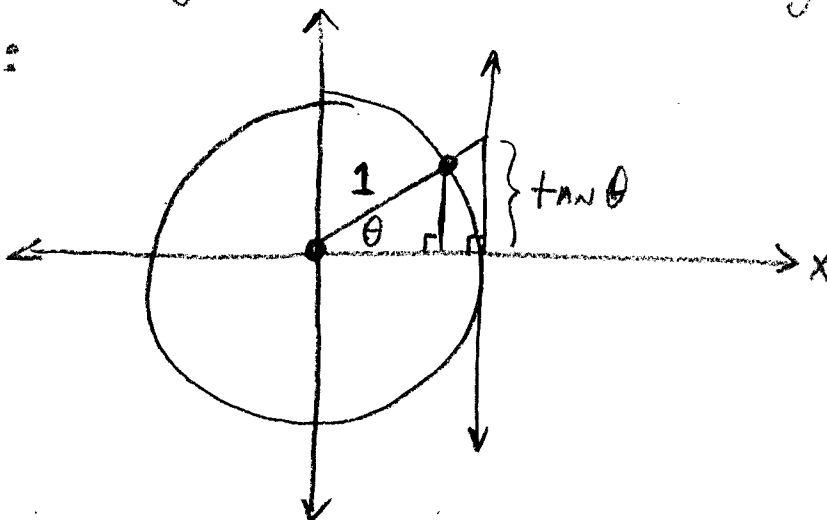
tangent ONE INTERSECTION



2 intersections

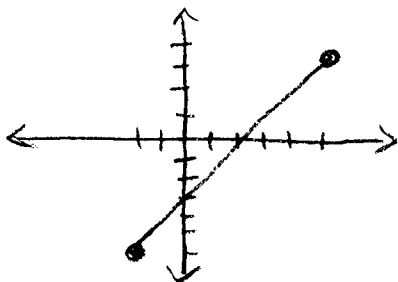
FYI Why is the tang. function called "tangent"?

Unit Circle:



EX 2
Pg 427

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



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

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

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

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

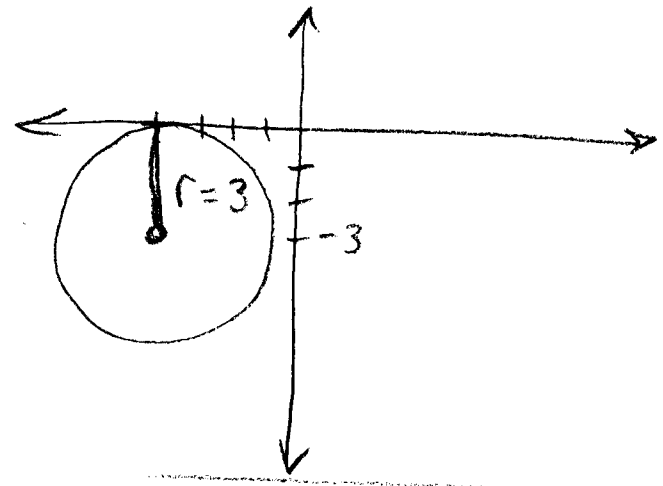
$$= \sqrt{\frac{149}{4}} = \frac{\sqrt{149}}{2} = r$$

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

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

EX 3
PG 427

WRITE THE EOC WITH CENTER AT $(-4, -3)$ TANGENT TO X-AXIS.



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

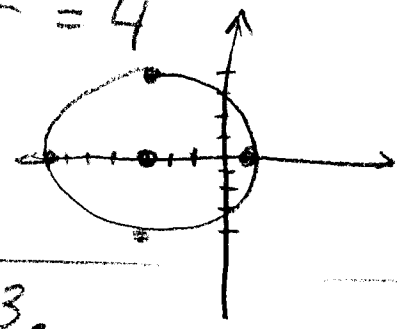
EX GRAPH $x^2 + y^2 + 6x - 7 = 0$

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

$$\downarrow \quad \downarrow$$

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

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



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