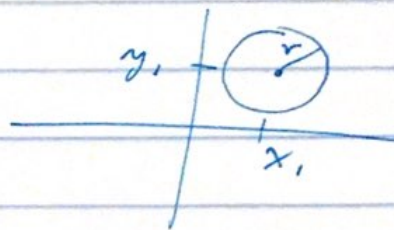


10.2 cont. (with one item from 10.5)

"Review"

Equation of circle: radius r , center (x_1, y_1)

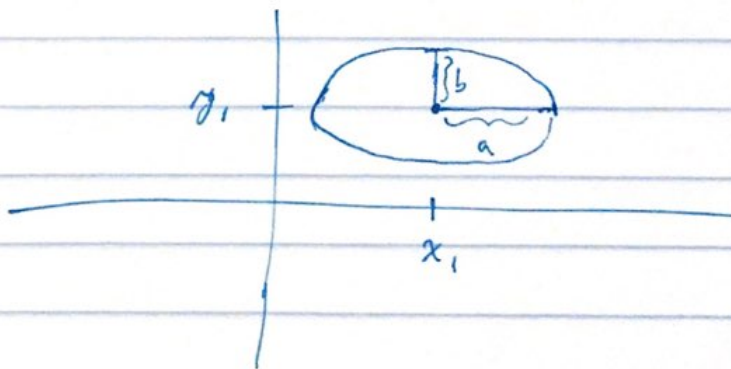
$$(x - x_1)^2 + (y - y_1)^2 = r^2$$



Equation of ellipse:

$$\frac{(x - x_1)^2}{a^2} + \frac{(y - y_1)^2}{b^2} = 1$$

Note: if $a = b$ then the ellipse is a circle, $r = a = b$.



Parametric equation of ellipse:

$$C = \begin{cases} x = x_1 + a \cos t \\ y = y_1 + b \sin t \end{cases}$$

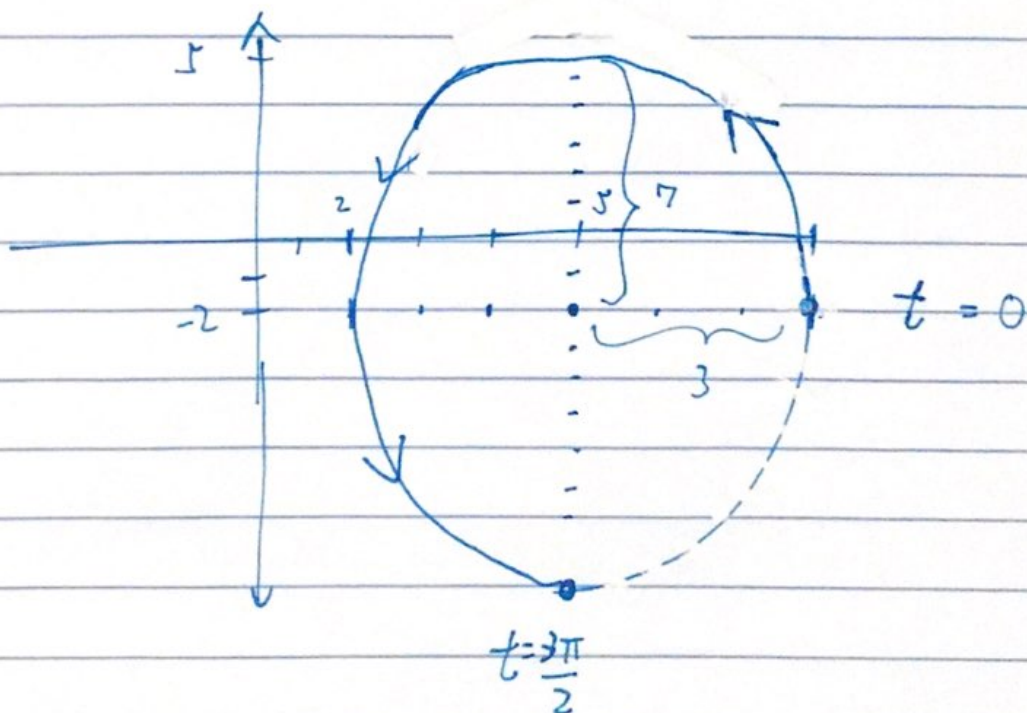
Ex: sketch + find length

$$C = \begin{cases} x = 5 + 3\cos t \\ y = -2 + 7\sin t \end{cases} \quad t \in [0, \frac{3\pi}{2}]$$

solve for $\cos t$, $\sin t$ then square + add:

$$\begin{aligned} x - 5 &= 3\cos t \Rightarrow \frac{x-5}{3} = \cos t \\ y + 2 &= 7\sin t \\ \frac{y+2}{7} &= \sin t \end{aligned}$$

$$\frac{(x-5)^2}{3^2} + \frac{(y+2)^2}{7^2} = 1$$



$$L = \int_0^{3\pi/2} \sqrt{(3(-\sin t))^2 + (7 \cos t)^2} dt$$

$$= \int_0^{3\pi/2} \sqrt{9 \sin^2 t + 49 \cos^2 t} dt$$

$$= 24.5143$$