Arc Length $\int_a^b ds$

$y = f(x)$ $ds = \sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx$

Chapter 8

$x = g(y)$ $ds = \sqrt{1+\left(\frac{dx}{dy}\right)^2}\,dy$

parametric $ds = \sqrt{\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2}\,dt$

Chapter 10

polar $ds = \sqrt{r^2+\left(\frac{dr}{d\theta}\right)^2}\,d\theta$

Go to Testing Center instead of coming to class in EDBH on Thursday.

I will post the take-home portion of the test in the Tests-U-Took folder.

Due Friday

$\sin^2\theta + \cos^2\theta = 1$

$\tan^2\theta + 1 = \sec^2\theta$

$\cot^2\theta + 1 = \csc^2\theta$

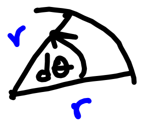
$\cos^2\theta = \dfrac{1+\cos(2\theta)}{2}$

$\sin^2\theta = \dfrac{1-\cos(2\theta)}{2}$

Area in polar coords (from sector of circle)

$A = \frac{1}{2}r^2\theta$

$A = \frac{1}{2}\int_{\alpha}^{\beta} r^2\, d\theta$

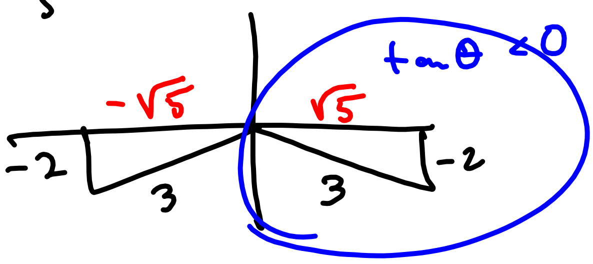


$\sin^2\left(\frac{\theta}{2}\right) = \dfrac{1-\cos\theta}{2}$

$\sin\left(\frac{\theta}{2}\right) = \pm\sqrt{\dfrac{1-\cos\theta}{2}}$

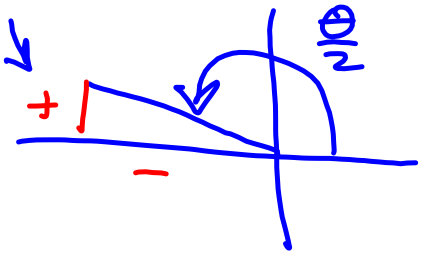
$\sin\theta = -\frac{2}{3}$ & $\tan\theta < 0$

$\sin\theta = -\frac{2}{3}$ Find $\sin\left(\frac{\theta}{2}\right)$



$\frac{3\pi}{2} < \theta < 2\pi$

$\frac{3\pi}{4} < \frac{\theta}{2} < \pi$



$\sin\frac{\theta}{2} = +\sqrt{\dfrac{1-\cos\theta}{2}}$

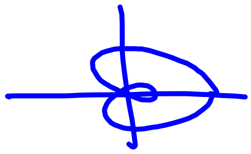
$= \sqrt{\dfrac{1-\left(\frac{\sqrt{5}}{3}\right)}{2}} = \sqrt{\dfrac{\frac{3-\sqrt{5}}{3}}{2}} = \sqrt{\dfrac{3-\sqrt{5}}{6}}$

$\dfrac{\frac{3-\sqrt{5}}{3}}{2} = \dfrac{3-\sqrt{5}}{3}\cdot\dfrac{1}{2}$

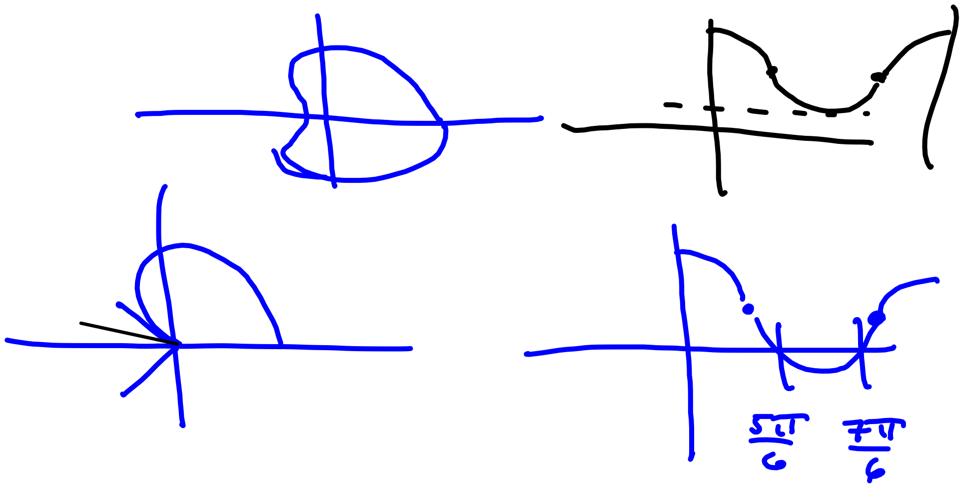
$a + b\cos\theta$, $a + b\sin\theta$

If $b > a$ it has a loop.

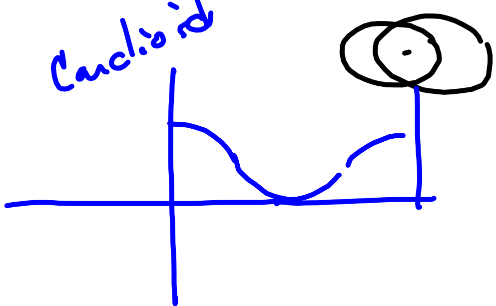
$1 + 2\cos\theta$



If $b < a$



Cardioid



$a = b$

$3 + 3\cos\theta$