

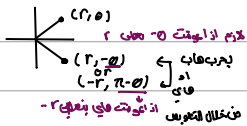
* أول اختبارهم أمرف حوالين فيجرب

Q1 $r = 1 + \cos \theta$

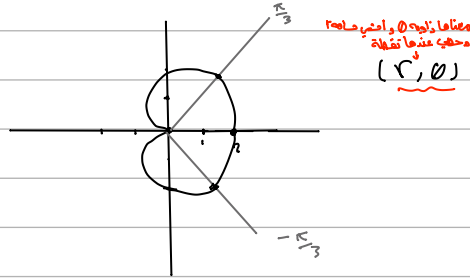
* $\cos(\theta) = \cos(-\theta)$

* $\sin(-\theta) = -\sin(\theta)$

1) Is it symmetric about the x-axis?



$\Rightarrow$ ① substitute $-\theta \Rightarrow 1 + \cos(-\theta) = 1 + \cos\theta = r \therefore$ symmetry about x-axis



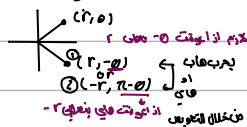
θ	r
$-\pi$	$4 \cos(\pi) = 1 + 1 = 0$
$-\frac{\pi}{3}$	$1 + \cos(\frac{\pi}{3}) = 1 + \frac{1}{2} = \frac{3}{2}$
0	$1 + \cos(0) = 1 + 1 = 2$
$\frac{\pi}{3}$	$4 \cos(\frac{\pi}{3}) = 1 + \frac{1}{2} = \frac{3}{2}$
π	$1 + \cos(\pi) = 1 - 1 = 0$
$\frac{\pi}{2}$	$1 + \cos(\frac{\pi}{2}) = 1$
$\frac{3\pi}{2}$	$1 + \cos(\frac{3\pi}{2}) = 1$

Q6

نفسه المعادل $r = 1 + 2\sin\theta$

* $\sin \theta = \sin(\pi - \theta)$

1) Is it symmetric about the x-axis?

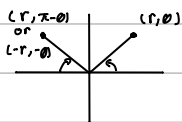


① substitute $- \theta \Rightarrow 1 + 2 \sin(-\theta) = 1 - 2 \sin(\theta) \neq r \quad X$

② $\therefore (\pi - \theta) \Rightarrow 1 + 2 \sin(\pi - \theta) = 1 + 2 \sin(\theta) \neq -r \quad \times$

0	r
$-\pi$	$1 + \sin(-\pi) = 1 + 0 = 1$
$-\frac{\pi}{6}$	$1 + \sin(-\frac{\pi}{6}) = 1 + -\frac{1}{2} = \frac{1}{2}$
0	$1 + \sin(0) = 1 + 0 = 1$
$\frac{\pi}{6}$	$1 + \sin(\frac{\pi}{6}) = 1 + \frac{1}{2} = \frac{3}{2}$
$\frac{\pi}{2}$	$1 + \sin(\frac{\pi}{2}) = 1 + 1 = 2$
$\frac{3\pi}{2}$	$1 + \sin(-\frac{\pi}{2}) = 1 - 1 = 0$
$\frac{\pi}{2}$	$1 + \sin(\frac{\pi}{2}) = 1 + 1 = 2$
$-\frac{\pi}{3}$	$1 + \sin(-\frac{\pi}{3}) = 1 - \frac{\sqrt{3}}{2} = \frac{2-\sqrt{3}}{2}$
$\frac{\pi}{3}$	$1 + \sin(\frac{\pi}{3}) = 1 + \frac{\sqrt{3}}{2} = \frac{2+\sqrt{3}}{2}$

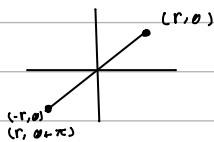
2) Is it symmetric about the y -axis?



① substitute $(\pi - \theta) \Rightarrow 1 + 2 \sin(\pi - \theta) = 1 + 2 \sin(\theta) = r \checkmark$

symmetry about y-axis

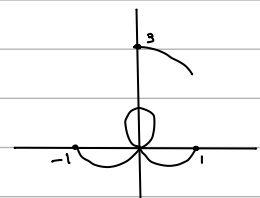
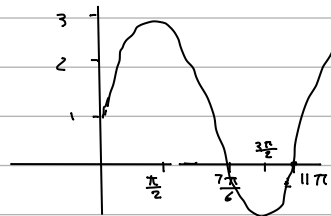
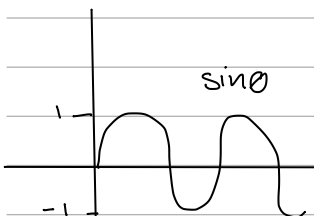
3) Is it symmetric about the origin?



① substitute $\theta \Rightarrow 1 + 2\sin \theta \neq r \quad \times$

// $0 + \pi \Rightarrow 1 + 2\sin(0 + \pi) \notin X$

های بنیاً نرسد عالطول اما القاص فی



نقطه ۲ ابتدا من $r=1$ عنها $\theta=0$ و نزدیک حلقه $r=3$

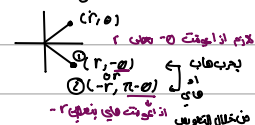
وعندها تكون $\theta = \frac{\pi}{2}$ ومن ثم تتوافق مع $\theta = 0$ عند $\frac{\pi}{7}$ ونفس التناقض

حتى $x = -1$ عندما $\theta = \frac{3\pi}{4}$ ومن ثم نزداد لـ $x = 0$ عندما $\theta = 0$ ومن ثم ننتهي التناهي

Q7 $r = \sin(\theta/2)$ ↗

يتوسع الركبة

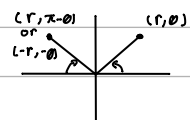
1) Is it symmetric about the x-axis?



① substitute $- \theta \Rightarrow \sin(-\theta/2) = -\sin(\theta/2) \neq r \quad X$

② $\therefore (\pi - \theta) \Rightarrow \sin(\pi - \theta) \neq \sin(\theta) \therefore \neq -r \quad \times$

2) Is it symmetric about the y axis?



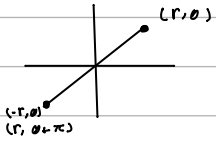
① substitute $(\pi - \theta) \Rightarrow \sin\left(\frac{\pi - \theta}{2}\right) \neq r \quad \times$

② // $(-\theta \Rightarrow \sin(\frac{-\theta}{2}) = -\sin \frac{\theta}{2} = -r \checkmark$

symmetry about y-axis

Leen Sabri

Is it symmetric about the origin?



① substitute $\theta \Rightarrow \sin(\frac{\theta}{2}) \neq -r$ X

// $\theta + \pi \Rightarrow \sin(\frac{\theta + \pi}{2}) =$