C_11 Key Correct Sinusoidal Graphs Two Ways

Thursday, October 13, 2022 4:20 PM

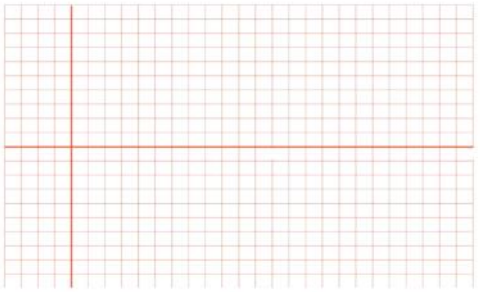
C_11 Sinusoidal Graphs Two Ways

Graphing Sinusoidal Functions – two methods

$y = 5\sin\theta - 3$

basic shape	vertical displacement	amplitude
equation of center line	maximum	minimum

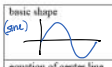
x	y



C_11 Sinusoidal Graphs Two Ways

Graphing Sinusoidal Functions – two methods

$y = 5\sin\theta - 3$

basic shape	vertical displacement	amplitude
(sin) 	down 3	5
equation of center line	maximum	minimum
$y = -3$	$-3+5=2$	$-3-5=-8$

1) plot center line
2) label Max and min on y-axis
3) label x-axis
4) create table of key points
5) plot and connect key points

Mapping Method

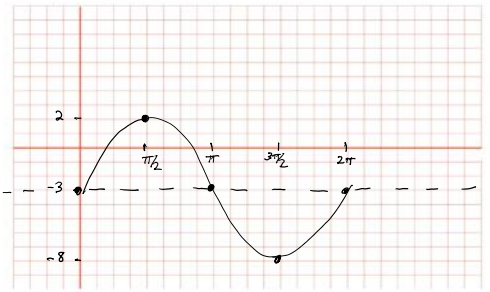
Base Graph $y = \sin\theta$

x	y
0	0
$\pi/2$	1
π	0
$3\pi/2$	-1
2π	0

x	$5y-3$
0	-3
$\pi/2$	2
π	-3
$3\pi/2$	-8
2π	-3

mapping: $(x, y) \to (x, 5y-3)$

1) create mapping
2) create base table and transformed table
3) label x-axis and y-axis
4) plot and connect key points

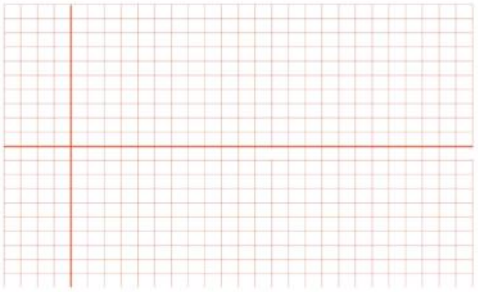


x	y	
0	-3	CL
$\pi/2$	2	M
π	-3	CL
$3\pi/2$	-8	M
2π	-3	CL

$$y = -7\cos\left(\frac{1}{2}\left(x+\frac{\pi}{3}\right)\right)+2$$

basic shape	vertical displacement	amplitude
equation of center line	maximum	minimum
period	spacing	phase shift

x	y



$$y = -7\cos\left(\frac{1}{2}\left(x+\frac{\pi}{3}\right)\right)+2$$

basic shape (reflected cosine) 	vertical displacement up 2	amplitude 7
equation of center line $y=2$	maximum $2+7=9$	minimum $2-7=-5$
period $\frac{2\pi}{\frac{1}{2}}$ or $2\pi\cdot\frac{2}{1}$ $=4\pi$	spacing $\frac{1}{4}$ period $=\frac{1}{4}(4\pi)$ $=\pi=\frac{3\pi}{3}$	phase shift $\pi/3$ left

Mapping method

$y=\cos\theta$

x	y
0	1
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1

$2x-\pi/3$ $\quad -7y+2$

$-\pi/3$	-5
$2\pi/3$	2
$5\pi/3$	9
$8\pi/3$	2
$11\pi/3$	-5

$(x,y) \to (2x-\pi/3, -7y+2)$

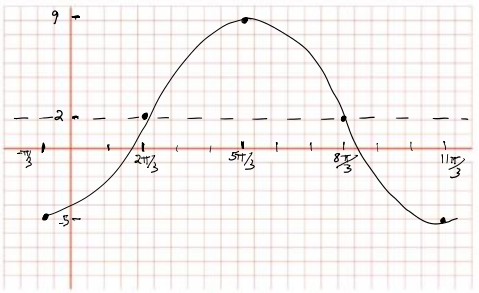
$2(0)-\pi/3 = 0-\pi/3 = -\pi/3$

$2(\pi/2)-\pi/3 = \pi-\pi/3 = 3\pi/3-\pi/3 = 2\pi/3$

$2(\pi)-\pi/3 = 2\pi-\pi/3 = 6\pi/3-\pi/3 = 5\pi/3$

$2(3\pi/2)-\pi/3 = 3\pi-\pi/3 = 9\pi/3-\pi/3 = 8\pi/3$

$2(2\pi)-\pi/3 = 4\pi-\pi/3 = 12\pi/3-\pi/3 = 11\pi/3$



x	y	
$-\pi/3$	-5	m
$2\pi/3$	2	CL
$5\pi/3$	9	M
$8\pi/3$	2	CL
$11\pi/3$	-5	m

These x-values are $\frac{3\pi}{3}$ apart, which is the "spacing"