PROBLEMS AND SOLUTIONS - GRAPHS OF SINE AND COSINE FUNCTIONS

Prepared by Ingrid Stewart, Ph.D., College of Southern Nevada
Please Send Questions and Comments to ingrid.stewart@csn.edu. Thank you!

PLEASE NOTE THAT YOU CANNOT ALWAYS USE A CALCULATOR ON THE ACCUPLACER - COLLEGE-LEVEL MATHEMATICS TEST! YOU MUST BE ABLE TO DO SOME PROBLEMS WITHOUT A CALCULATOR!

Problem 1:

Given $g(x) = 2\sin(2x)$, do the following:

a. state the amplitude and **EXACT** period
b. graph the function on the interval $[-2\pi, 2\pi]$
c. find the **EXACT** coordinates of the peaks using the graph
d. find the **EXACT** coordinates of the valleys using the graph
e. find the **EXACT** coordinates of the x-intercepts using the graph
f. find $g(\frac{2}{7})$ rounded to four decimal places

Problem 2:

Given $h(x) = -\frac{1}{2}\sin(\pi x)$, do the following:

a. state the amplitude and **EXACT** period
b. graph the function on the interval $[-4, 4]$
c. find the **EXACT** coordinates of the peaks using the graph
d. find the **EXACT** coordinates of the valleys using the graph
e. find the **EXACT** coordinates of the x-intercepts using the graph
f. find $h(\frac{2}{7})$ rounded to four decimal places

Problem 3:

Given $f(x)=2\cos\left(\frac{x}{2}\right)$, do the following:

a. state the amplitude and **EXACT** period
b. graph the function on the interval $[-8\pi,8\pi]$
c. find the **EXACT** coordinates of the peaks using the graph
d. find the **EXACT** coordinates of the valleys using the graph
e. find the **EXACT** coordinates of the x-intercepts using the graph
f. find $f\left(\frac{2}{7}\right)$ rounded to four decimal places

Problem 4:

Given $p(x)=-\frac{1}{2}\cos\left(\frac{\pi x}{2}\right)$, do the following:

a. state the amplitude and **EXACT** period
b. graph the function on the interval $[-8,8]$
c. find the **EXACT** coordinates of the peaks using the graph
d. find the **EXACT** coordinates of the valleys using the graph
e. find the **EXACT** coordinates of the x-intercepts using the graph
f. find $p\left(\frac{2}{7}\right)$ rounded to four decimal places

SOLUTIONS

You can find detailed solutions below the link for this problem set!

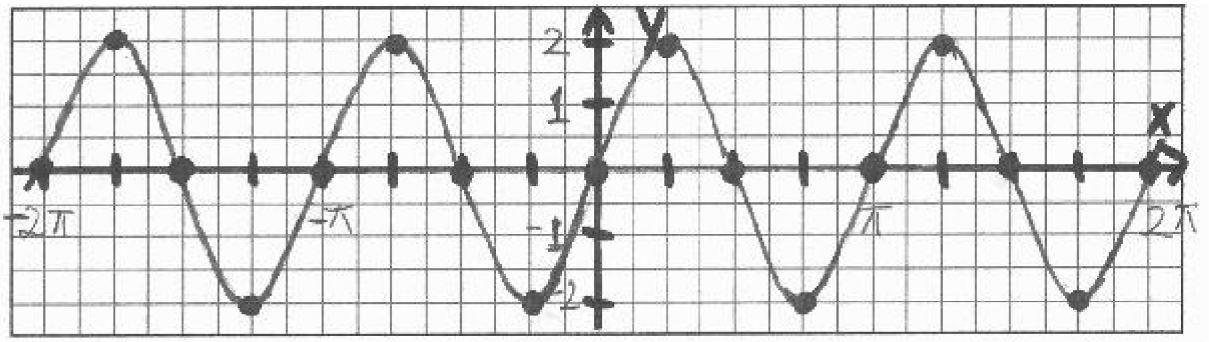
Problem 1:

a. Amplitude: 2

Period: π

b. Graph of the function on the interval $[-2\pi,2\pi]$:

Please note that the peaks and valleys in the graphs of the sine and cosine functions are U-shaped!



c. **EXACT** coordinates of the peaks using the graph

(-7π/4, 2), (-3π/4, 2), (π/4, 2), (5π/4, 2)

d. **EXACT** coordinates of the valleys using the graph

(-5π/4, -2), (-π/4, -2), (3π/4, -2), (7π/4, -2)

e. **EXACT** coordinates of the x-intercepts using the graph

(-2π, 0), (-3π/2, 0), (-π, 0), (-π/2, 0)

(0, 0), (π/2, 0), (π, 0), (3π/2, 0), (2π, 0)

f. $g(\frac{2}{7}) \approx 1.0817$

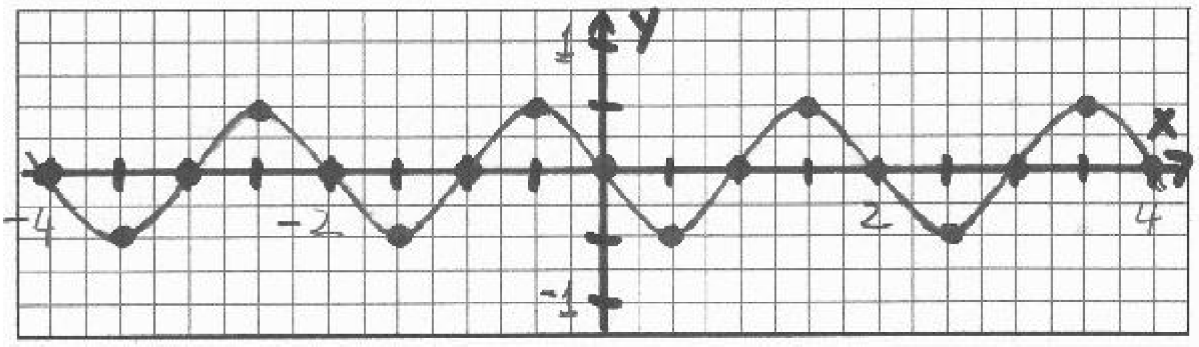
Problem 2:

a. Amplitude: ***1/2***

Period: ***2***

b. Graph of the function on the interval $[-4,4]$:

Please note that the peaks and valleys in the graphs of the sine and cosine functions are U-shaped!



c. **EXACT** coordinates of the peaks using the graph

(-2.5, 0.5), (-0.5, 0.5), (1.5, 0.5), (3.5, 0.5)

d. **EXACT** coordinates of the valleys using the graph

(-3.5, -0.5), (-1.5, -0.5), (0.5, -0.5), (2.5, -0.5)

e. **EXACT** coordinates of the x-intercepts using the graph

(-4, 0), (-3, 0), (-2, 0), (-1, 0), (0, 0), (1, 0), (2, 0), (3, 0), (4, 0)

f. $h\left(\frac{2}{7}\right) \approx -0.3909$

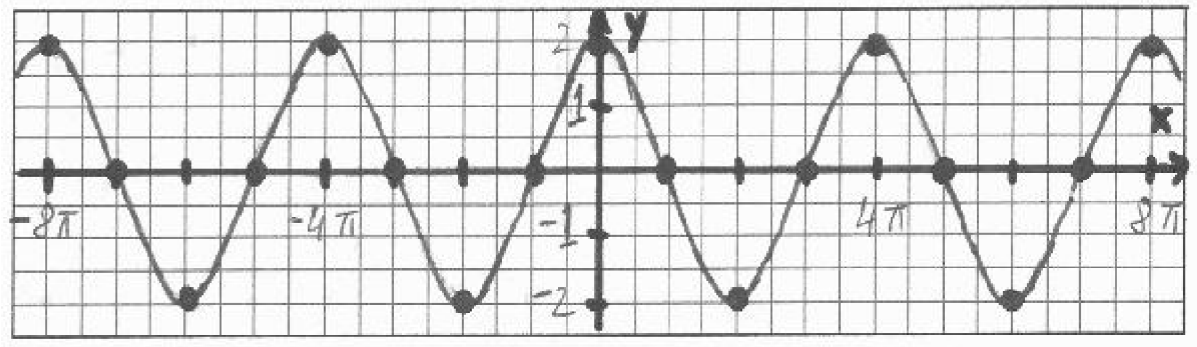
Problem 3:

a. Amplitude: 2

Period: 4π

b. Graph of the function on the interval $[-8\pi, 8\pi]$:

Please note that the peaks and valleys in the graphs of the sine and cosine functions are U-shaped!



c. **EXACT** coordinates of the peaks using the graph

$(-8\pi, 2), (-4\pi, 2), (0, 2), (4\pi, 2), (8\pi, 2)$

d. **EXACT** coordinates of the valleys using the graph

$(-6\pi, -2), (-2\pi, -2), (2\pi, -2), (6\pi, -2)$

e. **EXACT** coordinates of the x-intercepts using the graph

$(-7\pi, 0), (-5\pi, 0), (-3\pi, 0), (-\pi, 0)$

$(\pi, 0), (3\pi, 0), (5\pi, 0), (7\pi, 0)$

f. $f\left(\frac{2}{7}\right) \approx 1.9796$

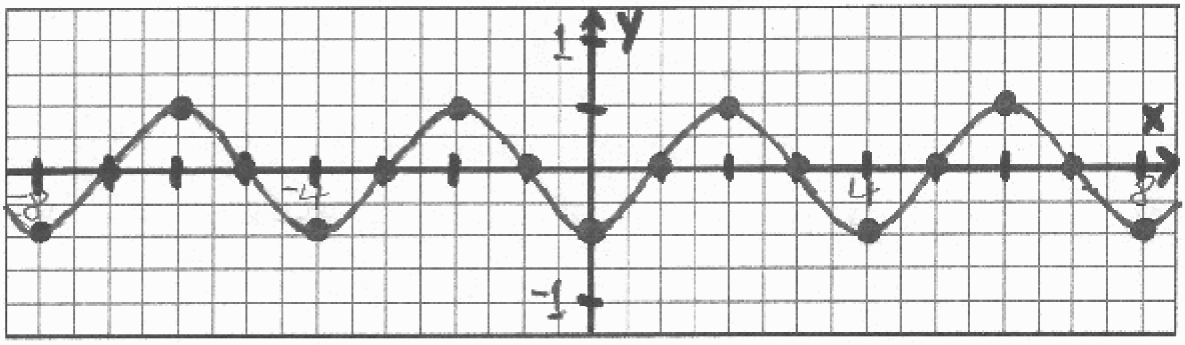
Problem 4:

a. Amplitude: $1/2$

Period: 4

b. Graph of the function on the interval $[-8, 8]$:

Please note that the peaks and valleys in the graphs of the sine and cosine functions are U-shaped!



c. **EXACT** coordinates of the peaks using the graph

(-6, 0.5), (-2, 0.5), (2, 0.5), (6, 0.5)

d. **EXACT** coordinates of the valleys using the graph

(-8, -0.5), (-4, -0.5), (0, -0.5), (4, -0.5), (8, -0.5)

e. **EXACT** coordinates of the x-intercepts using the graph

(-7, 0), (-5, 0), (-3, 0), (-1, 0), (1, 0), (3, 0), (5, 0), (7, 0)

f. $p\left(\frac{2}{7}\right) \approx -0.4505$