Name_____

Graphs of Sine and Cosine Functions

Period_____ Group #_____

Determine the amplitude and period of each function.

1. $y = \sin 4x$

Amplitude = 1

Period = $2\pi/4 = \pi/2$

2. $y = \cos 5x$

Amplitude = 1

Period = $2\pi/5$

3. $y = \sin x$

Amplitude = 1

Period = 2π

4. $y = 4 \cos x$

Amplitude = 4

Period = 2π

5. $y = -2 \sin x$

Amplitude = 2

Period = 2π

6. $y = 2 \sin(-4x)$

Amplitude = 2

Period = $2\pi/4 = \pi/2$

7. $y = 3 \sin \frac{2}{3}x$

Amplitude = 3

Period = $2\pi/2/3 = 3\pi$

8. $y = -4 \cos 5x$

Amplitude = 4

Period = $2\pi/5$

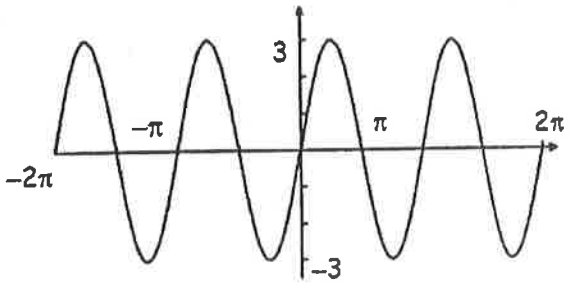
9. $y = 3 \cos(-2x)$

Amplitude = 3

Period = π

Give the amplitude and period of each function graphed below. Then write an equation of each graph.

10.

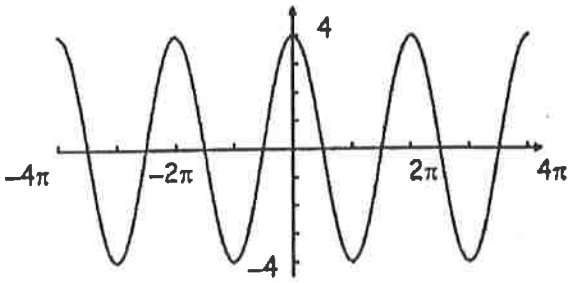


Amplitude = 3

Period = π

Equation: $y = 3\sin 2x$

11.

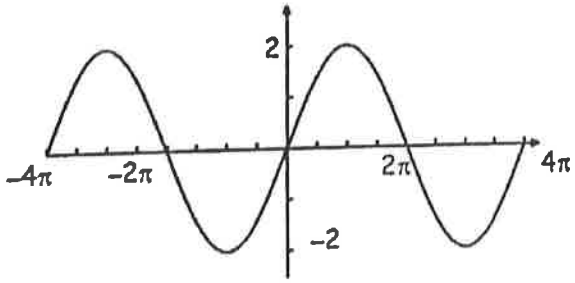


Amplitude = 4

Period = 2π

Equation: $y = 4\cos x$

12.

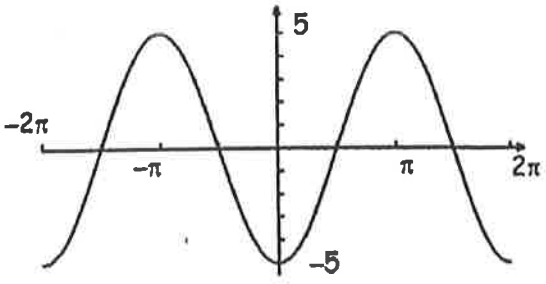


Amplitude = 2

Period = 4π

Equation: $y = 2\sin x/2$

13.



Amplitude = 5

Period = 2π

Equation: $y = -5\cos x$

Sine Applications Homework

1) The following table shows the number, in millions, of unemployed people in the labor force for 1984-1995.

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Unemp	8.539	8.312	8.237	7.425	6.701	6.528	7.047	8.628	9.613	8.940	7.996	7.404

a) Enter the data in your calculator and get a scatter plot, with x = 0 corresponding to 1980. Does the data appear to be periodic?

Somewhat, the peak in 1992 does not fit well

b) Find a sine equation that models the data.

$y = 1122.3 \sin(-0.64x - 2.79) + 7881.34$

c) Do you think this model is likely to be accurate much beyond the year 1995? Why or why not?

No because the factors that affect unemployment do not vary in a consistent manor.

d) What is the period of the function?

$\text{period} = \frac{2\pi}{B} = \frac{2\pi}{.64} = +9.82$

e) What is the average number of unemployed people and what part of the model did you use to find it?

$d = 7,881$

2) The table shows the average monthly precipitation in inches, in San Francisco, CA, based on data from 1961 to 1990.

Month	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Precipitation	4.4	3.2	3.1	1.4	0.2	0.1	0	0.1	0.2	1.2	2.9	3.1

a) Make a scatter plot of the data in your calculator. Does the data appear to be periodic?

yes, although very flat in the summer months.

b) Use the sine regression feature on a calculator to find a sinusoidal model for the data.

$y = 2.51 \sin(.41x + 1.79) + 2.26$

c) What is the period of the function?

$\text{period} = \frac{2\pi}{B} = \frac{2\pi}{.41} =$

d) By how much does the precipitation vary in this period?

actual range 4.4 inches

Model range $= 2(2.51) = 5.02$ inches

3) At a county fair, the Ferris wheel has a diameter of 18m, and its centre is 11m above the ground. The wheel completes one revolution every 20s. At t=0 you are at the 3 o'clock position

a) Graph a rider's height above the ground, in meters, versus the time, in seconds, during a full revolution. please see attached graph

b) Determine the amplitude, period, phase shift, and vertical shift of this function.

$a = 9\,m$, period $= 20$ sec, phase shift $= 0$, vertical shift $= 11\,m$

c) Determine an equation that models the rider's height with respect to time.

$y = 9 \sin \pi/10\, t + 11\,m$

d) How high will the rider be after 42 seconds? (Round to the nearest hundredth)

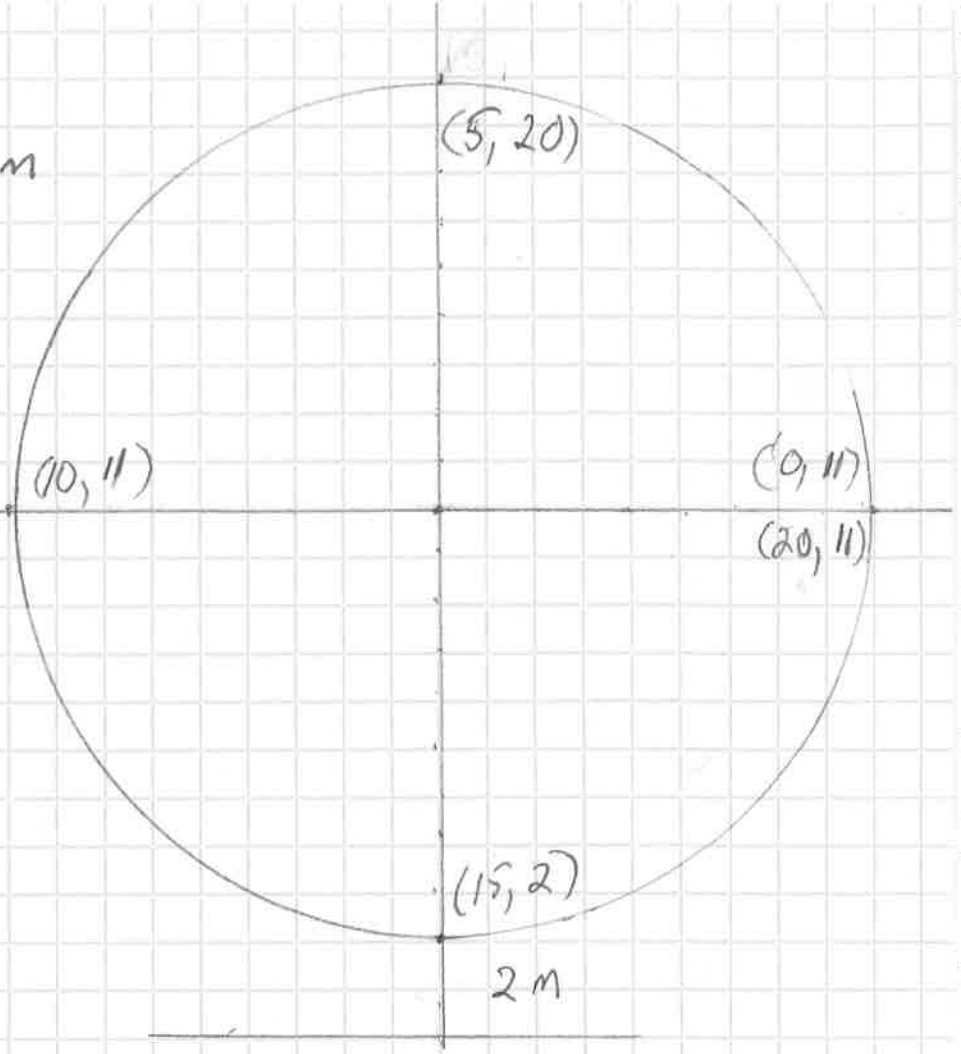
$f(42) = 16.29\,m$

$d = 11$ m $a = 9$ m

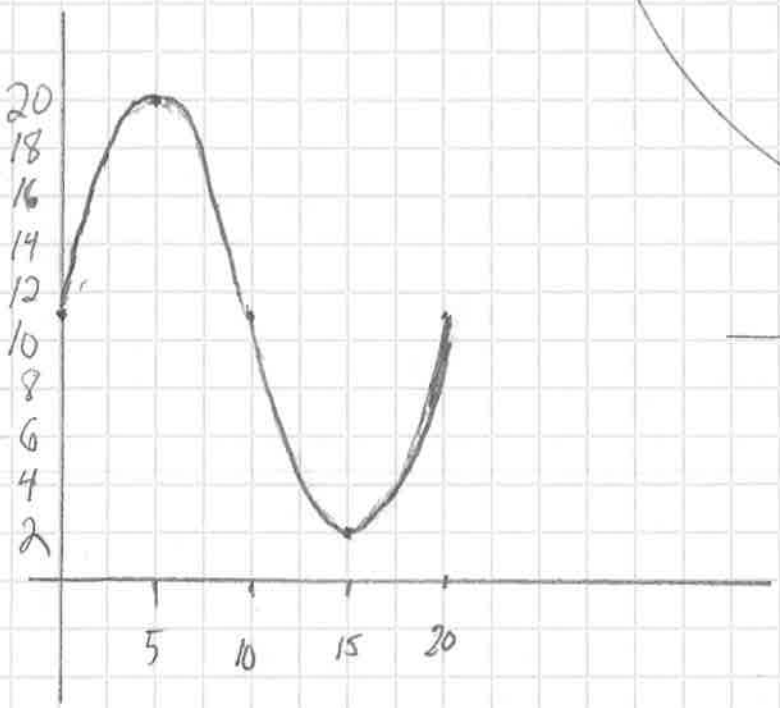
Period $= 20$ sec

$t = 0$ 3 o'clock

$B = \frac{2\pi}{20} = \frac{\pi}{10}$



(a)



(b) $a = 9$, period 20 sec, phase shift $= 0$

vertical shift $= 11$

(c) $y = 9 \sin \pi/10 t + 11$

(d) $f(42) = 9 \sin (\pi/10)(42) + 11$

$f(42) = 16.29$ m