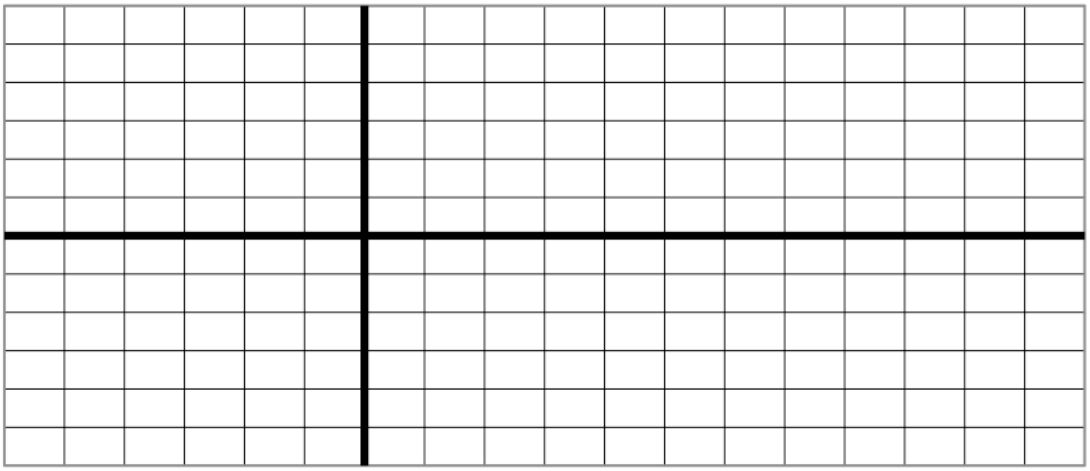
/17K	/21A	/4C	/10T	Total /52

Name: _____ Date: _____

MCR3U Test: Trigonometric functions

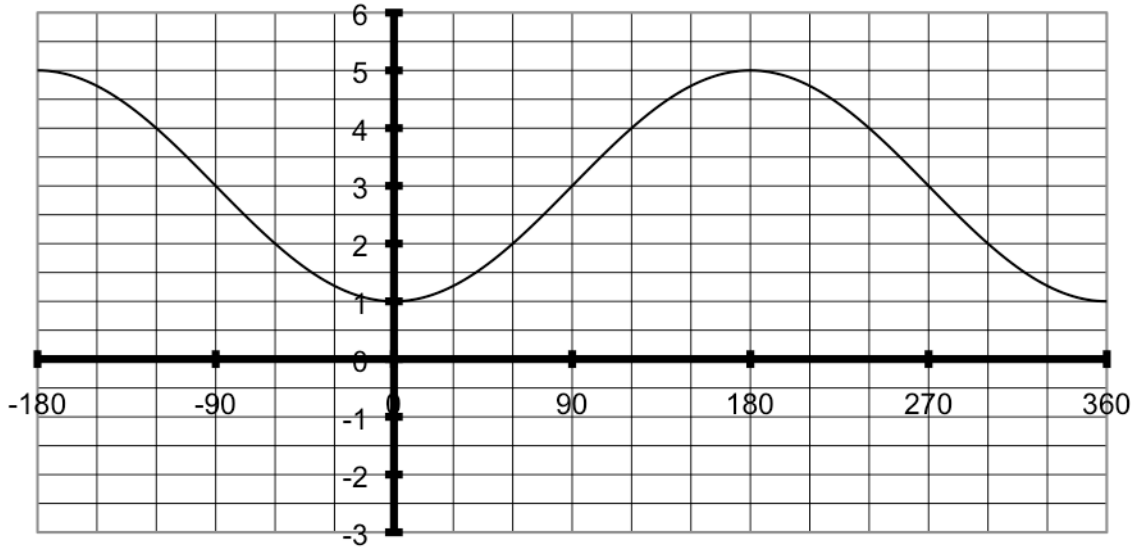
/3 K

1. Sketch one cycle of the graph of $y = -4\sin x$. Include an appropriate scale on each axis.



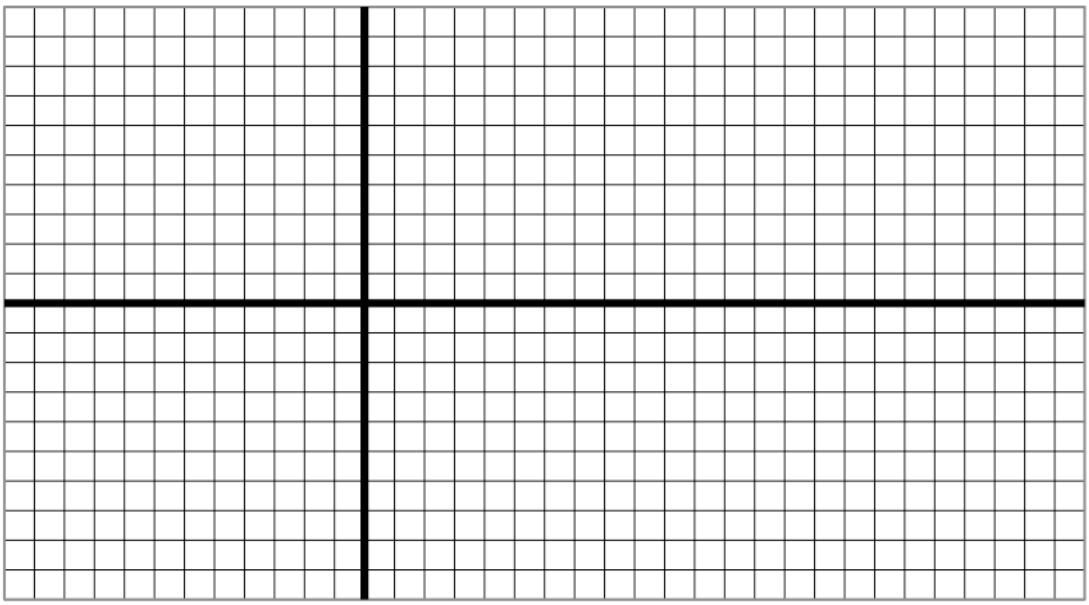
/3 A

2. Write an equation to represent the sinusoidal function in the following graph.



/5
K

3. Sketch two cycles of the graph of $y = 2\sin(x + 60^o) - 3$. Include an appropriate scale on each axis.



/1
C

4. The equation of a cosine function is $y = 2\cos(5x - 150^o)$. Explain why the phase shift is not 150°.

/2
K

5. Determine the period of the function $y = 3\sin\left[\frac{2}{5}(x - 45^o)\right] + 7$.

/3
K

6. Describe the transformations that must be applied to the graph of $f(x) = \sin x$ to obtain the graph of $g(x) = -\sin\left[2(x + 30^o)\right]$.

/4
T

7. A sinusoidal function has an amplitude of 6 units, a period of 180°, and a minimum at (0, –1). Represent the function with an equation using a sine or cosine function.

/2
T

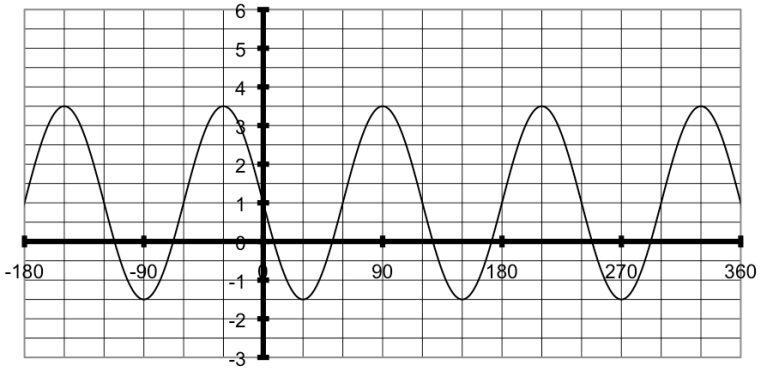
8. Represent the graph of $f(x) = \sin\left[2(x - 30^o)\right] + 4$ with an equation using a cosine function.

/4
K

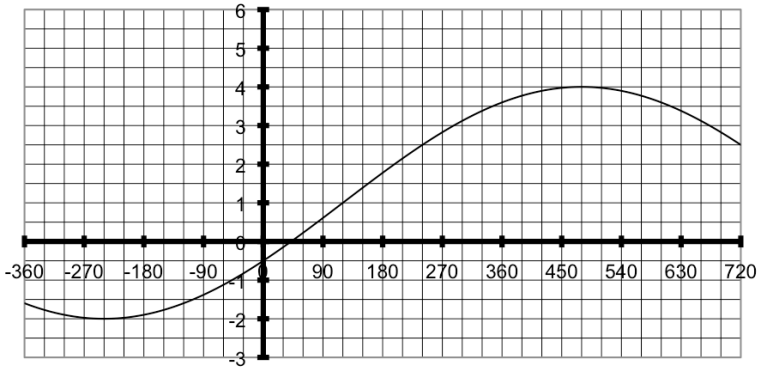
/4
A

9. Determine equations to model each of the following sinusoidal functions.

a)



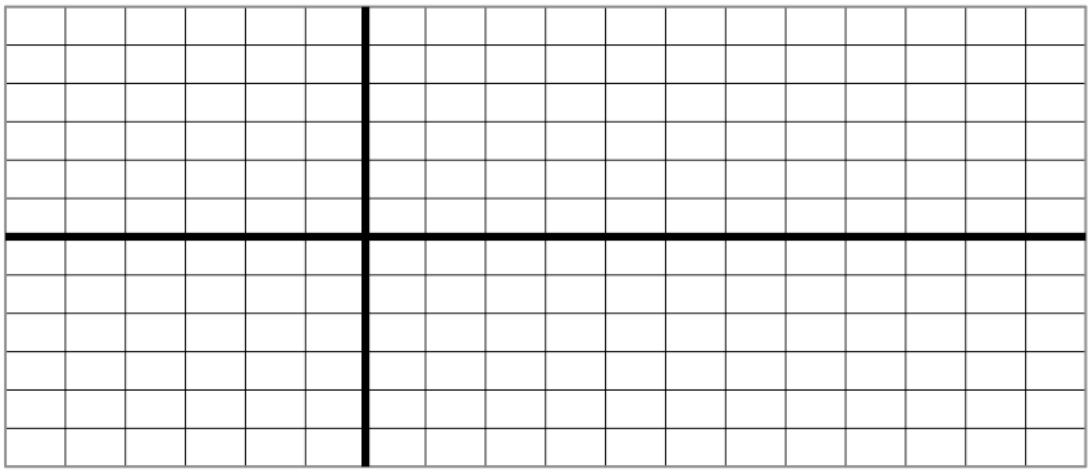
b)



/4
A

10. Graph the sinusoidal function $y = 3\sin\left[\frac{2}{3}(x+135^o)\right] - 2$. Label the amplitude on the graph.

/1
T



/5
A

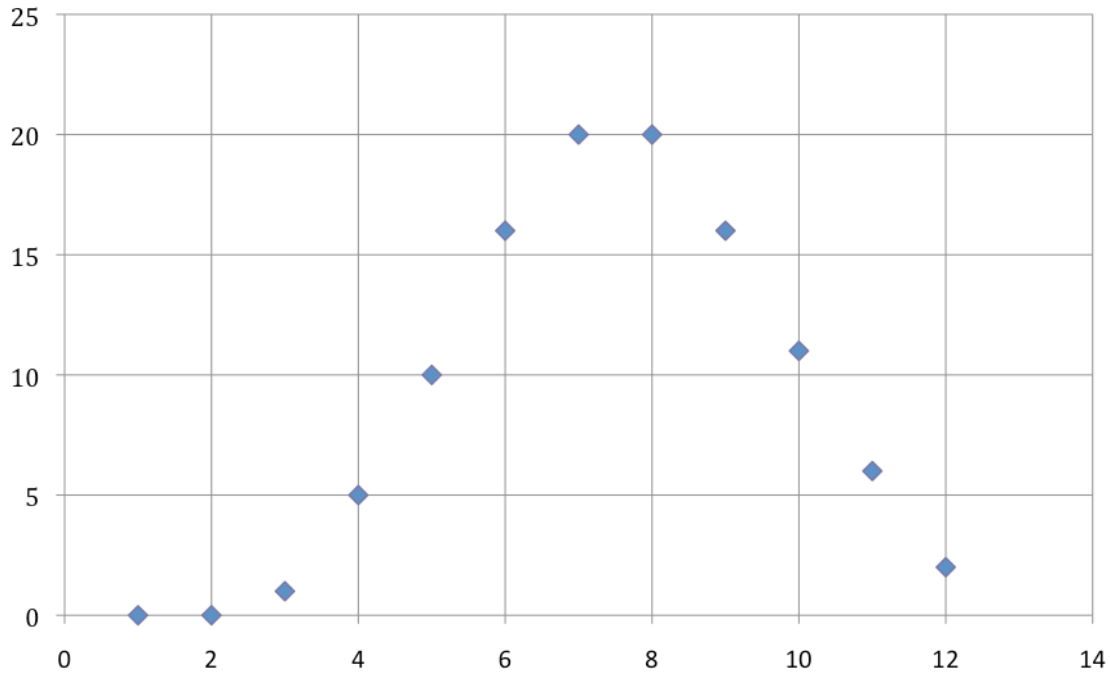
/1
C

11. The following table lists average monthly high temperatures (°C) in St. John's NF for one year.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	1	5	10	16	20	20	16	11	6	2

a) Determine a sinusoidal equation to model this data.

b) Graph the equation below AND describe any discrepancies between the equation and data.



/5
A

12. The height, h, in metres, of the tide in a given location on a given day at t hours after midnight can be modeled using the sinusoidal function $h(t) = 2.6\sin[30(t-8)] + 4.3$.

a) Determine the maximum depth, h, of the water.

b) Determine a time at which low tide occurs.

c) What is the depth of the water at 7 am?

/3
T

/2
C

13. The following table shows annual average sunspot activity from 1970 to 2006. Predict the next three occurrences of maximum sunspot activity after 2006. Explain your reasoning.

Year (since 1970)	Sunspots (Annual Average)	Year (since 1970)	Sunspots (Annual Average)
0	107.4	19	162.2
1	66.5	20	145.1
2	67.3	21	144.3
3	36.7	22	93.5
4	32.3	23	54.5
5	14.4	24	31
6	11.6	25	18.2
7	26	26	8.4
8	86.9	27	20.3
9	145.8	28	61.6
10	149.1	29	96.1
11	146.5	30	123.3
12	114.8	31	123.3
13	64.7	32	109.4
14	43.5	33	65.9
15	16.2	34	43.3
16	11	35	30.2
17	29	36	15.4
18	100.9		