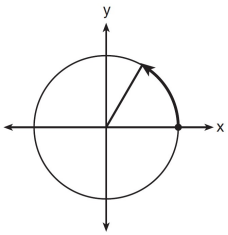
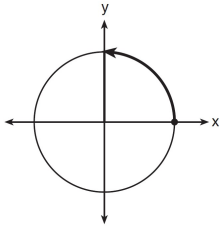
Name _____ Date _____

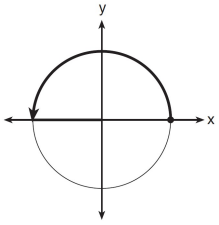
Mr. Schlansky Algebra II

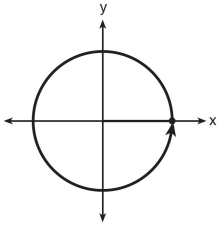
Trigonometry Review Sheet

1. Which diagram shows an angle rotation of 1 radian on the unit circle?

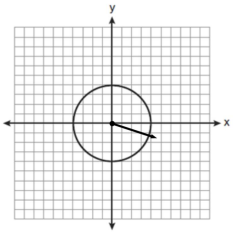
1) 

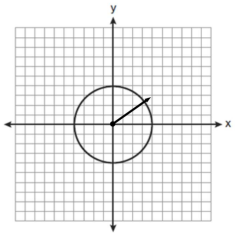
2) 

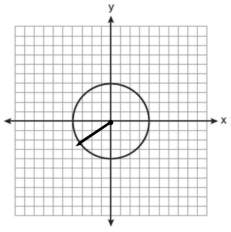
3) 

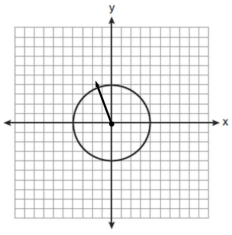
4) 

2. Which of the following sketches would represent 6 radians?

1) 

2) 

3) 

4) 

3. What is the exact value of $\cos\left(-\frac{5\pi}{6}\right)$?

1) $\frac{\sqrt{3}}{2}$

2) $\frac{1}{2}$

3) $-\frac{\sqrt{3}}{2}$

4) $-\frac{\sqrt{2}}{2}$

4. The exact value of $\sin\left(\frac{8\pi}{3}\right)$ is

1) $\frac{1}{2}$

2) $-\frac{1}{2}$

3) $-\frac{\sqrt{3}}{2}$

4) $\frac{\sqrt{3}}{2}$

5. If $\tan\theta = -\frac{24}{7}$ and θ is in Quadrant IV, find:

a) $\cos\theta$ b) $\sin\theta$ c) $\tan\theta$

d) $\sec\theta$ e) $\csc\theta$ f) $\cot\theta$

6. If $\sin\theta = \frac{5}{8}$ and θ is in Quadrant II, find:

a) $\cos\theta$ b) $\sin\theta$ c) $\tan\theta$

d) $\sec\theta$ e) $\csc\theta$ f) $\cot\theta$

7. If θ passes through (-2,3), find:

a) $\cos\theta$ b) $\sin\theta$ c) $\tan\theta$

d) $\sec\theta$ e) $\csc\theta$ f) $\cot\theta$

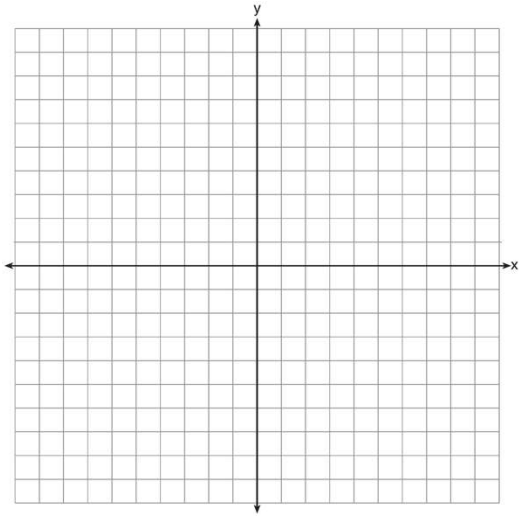
8. If θ passes through (-7,-24), find:

a) $\cos\theta$ b) $\sin\theta$ c) $\tan\theta$

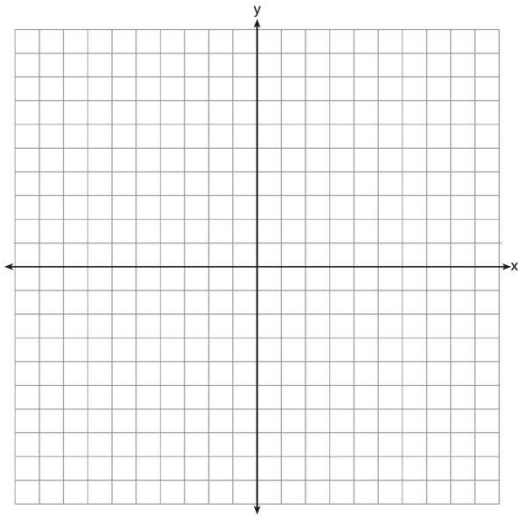
d) $\sec\theta$ e) $\csc\theta$ f) $\cot\theta$

Graph one full cycle of the following sinusoidal functions:

9. $y = -3\cos 2x - 4$



10. $y = 4\sin \pi x - 3$



11. The depth of the water at a marker 20 feet from the shore in a bay is depicted in the graph below.

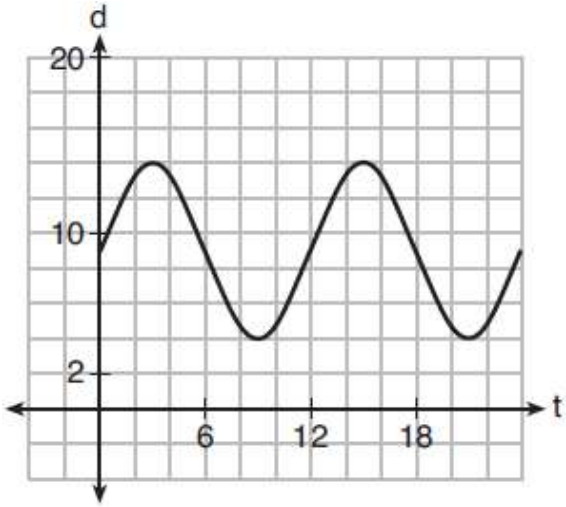
If the depth, *d*, is measured in feet and time, *t*, is measured in hours since midnight, what is an equation for the depth of the water at the marker?

1) $d = 5\cos\left(\frac{\pi}{6}t\right)+9$

2) $d = 5\cos\left(\frac{\pi}{9}t\right)+9$

3) $d = 5\sin\left(\frac{\pi}{6}t\right)+9$

4) $d = 5\sin\left(\frac{\pi}{9}t\right)+9$



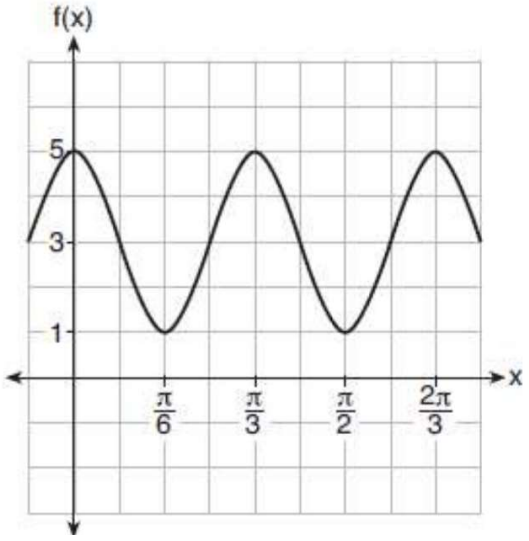
12. Which equation would represent the given graph?

1) $y = 2\cos(3x)+3$

2) $y = 2\cos(6x)+3$

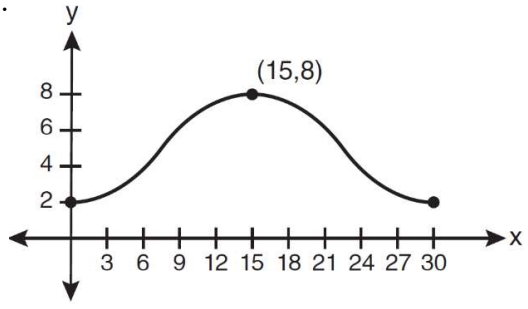
3) $y = -2\sin(3x)+3$

3) $y = -2\sin(6x)+3$

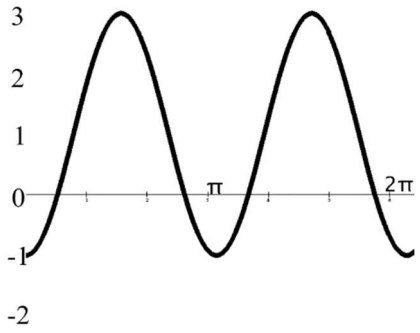


Write the equations of the sinusoidal functions given below.

13.

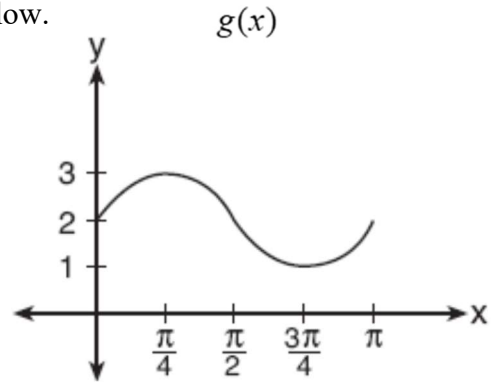


14.



15. Two sinusoidal functions, f and g, are shown below.

$$f(x) = -2\cos\left(\frac{1}{3}x\right) + 4$$

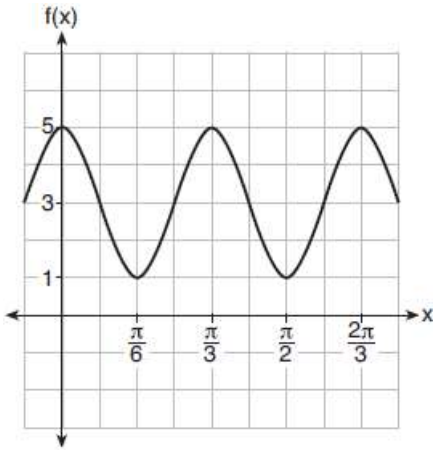


Which statement is *not* true?

1) The maximum value of f is larger than the maximum value of g.
2) The period of f is longer than the period of g.
3) The midline of f is smaller than the midline of g.
4) The y-intercept of f is the same as the y-intercept of g.

16. Two sinusoidal functions, f and g, are shown below.

$$g(x) = 3\sin(8x) - 2$$



Which statement is true?

1) The maximum value of f is smaller than the maximum value of g.
2) The midline of f is larger than the midline of g.
3) The y-intercept of f is smaller than the y-intercept of g.
4) The period of f is smaller than the period of g.

17. The depth of the water, $d(t)$, in feet, on a given day at Thunder Bay, t hours after midnight is modeled by $d(t) = 5\sin\left(\frac{\pi}{6}(t-5)\right) + 7$. Which statement about the Thunder Bay tide is *false*?

1) A low tide occurred at 2 a.m.
2) The maximum depth of the water was 12 feet.
3) The water depth at 9 a.m. was approximately 11 feet.
4) The difference in water depth between high tide and low tide is 14 feet.

18. Based on climate data that have been collected in Bar Harbor, Maine, the average monthly temperature, in degrees F, can be modeled by the equation $B(x) = 23.914\sin(0.508x - 2.116) + 55.300$. The same governmental agency collected average monthly temperature data for Phoenix, Arizona, and found the temperatures could be modeled by the equation $P(x) = 20.238\sin(0.525x - 2.148) + 86.729$. Which statement can *not* be concluded based on the average monthly temperature models x months after starting data collection?

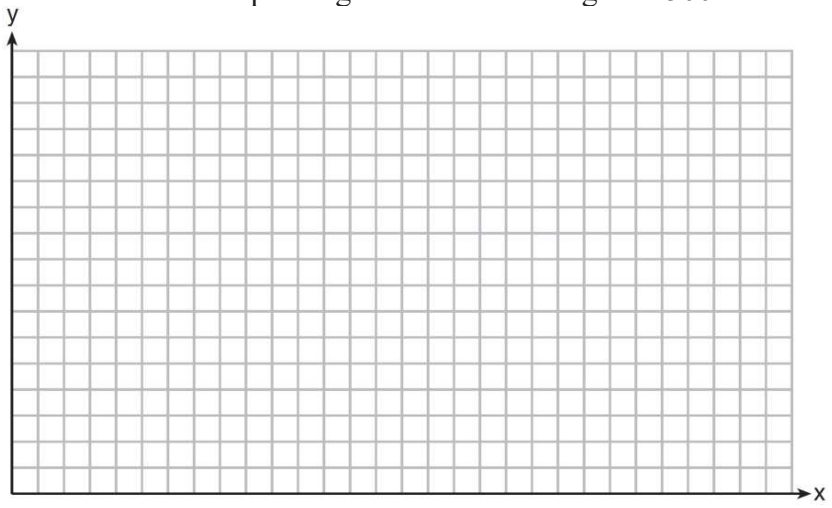
1) The average monthly temperature variation is more in Bar Harbor than in Phoenix.
2) The midline average monthly temperature for Bar Harbor is lower than the midline temperature for Phoenix.
3) The maximum average monthly temperature for Bar Harbor is 79° F, to the nearest degree.
4) The minimum average monthly temperature for Phoenix is 20° F, to the nearest degree.

Find the minimum and maximum values of the following.

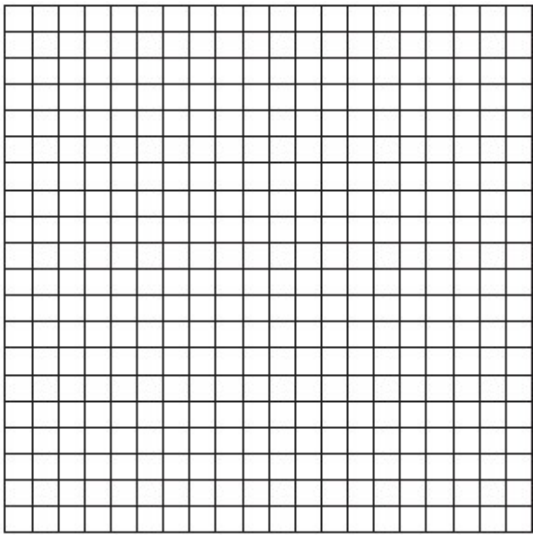
19. $y = -3\cos\left[\frac{\pi}{3}(x-4)\right] + 7$

20. $H(t) = 4.8\sin\left(\frac{\pi}{6}(t+3)\right) + 5.1$

21. The High Roller, a Ferris wheel in Las Vegas, Nevada, opened in March 2014. A passenger's height, in feet, above the ground after t minutes can be modeled by the equation $h(t) = -260\cos\left(\frac{\pi}{15}t\right) + 290$. Graph one full cycle of $h(t)$ on the axes provided. Identify the period and state its meaning in the context of the problem. To the *nearest tenth of a second*, after how much time will the passenger first reach a height of 500 feet?



22. Griffin is riding his bike down the street in Churchville, N.Y. at a constant speed, when a nail gets caught in one of his tires. The height of the nail above the ground, in inches, can be represented by the trigonometric function $f(t) = -13\cos(0.8\pi t) + 13$, where t represents the time (in seconds) since the nail first became caught in the tire. Determine the period of $f(t)$. Interpret what the period represents in this context. On the grid below, graph *at least one* cycle of $f(t)$ that includes the y-intercept of the function. Does the height of the nail ever reach 30 inches above the ground? Justify your answer.



23. For $x > 0$, which expression is equivalent to $\frac{\sqrt[3]{x^2} \bullet \sqrt{x^5}}{\sqrt[6]{x}}$?

1) x
2) $x^{\frac{3}{2}}$
3) x^3
4) x^{10}

24. Given $y > 0$, the expression $\sqrt{3x^2y} \bullet \sqrt[3]{27x^3y^2}$ is equivalent to

1) $81x^5y^3$
2) $3^{1.5}x^2y$
3) $3^{\frac{5}{2}}x^2y^{\frac{5}{3}}$
4) $3^{\frac{3}{2}}x^2y^{\frac{7}{6}}$

25. Dee is planning on decreasing the amount of time she eats fast food per month. During the first month, she ate fast food 42 times. Each month, she eats at fast food restaurants 10% less than the previous month. How many total times does she eat fast food in the first 4 months rounded to the *nearest integer*?

26. Kina earns a $27,000 salary for the first year of work at her job. She earns annual increases of 2.5%. What is the total amount, to the *nearest cent*, that Kina will earn for the first eight years at this job?

27. Which value, to the *nearest tenth*, is a solution of $f(x) = g(x)$ if $f(x) = 4\sin(2(x-4)) + 3$ and $g(x) = 4\ln(x) + 3$?

1) 0.8
2) 2.03
3) (2.03,5.84)
4) (0.5, 0.8)

28. Which value, to the *nearest tenth*, is a solution of $f(x) = g(x)$ if $f(x) = 3\sin\left(\frac{1}{2}x\right) - 1$ and $g(x) = x^3 - 2x + 1$?

1) -3.6
2) -2.1
3) -1.8
4) 1.8