Unit 3 (4.9) Graphing All Dilations and Translations (in degrees and radians!)

The process for graphing in radians is no different than graphing in degrees.
The only change you need to make is the x-axis should be labeled in radians instead of degrees.
***θ indicates degrees, x indicates radians**

1. Graph $y = 5sinx$

2. Graph $y = 3cosx + 4$

3. Graph $y = cos(x + \frac{\pi}{2})$

4. Graph $y = sin[2(x - \frac{\pi}{3})]$

5. Graph $y = \cos\frac{1}{3}x - 2$

6. Graph $y = -2sin(x - \frac{\pi}{6})$

7. $y = 3cos2\left(x + \frac{\pi}{6}\right)$

8. $y = -\sin\frac{1}{4}\left(x + \frac{\pi}{2}\right) - 1$

9. $y = \cos\frac{1}{2}\left(x - \frac{\pi}{3}\right) + 4$

10. $y = 4sin3\left(x - \frac{\pi}{4}\right)$

11. Graph: $y = 4\cos[\frac{1}{2}\left(x + \frac{\pi}{4}\right)] - 2$

- v.d.: _____
- v.t.: _____
- h.d.: _____ period: _____
- h.t.: _____

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12. Graph: $y = -3\sin\left[6\left(x - \frac{2\pi}{3}\right)\right] + 1$

- v.d.: _____
- v.t.: _____
- h.d.: _____ period: _____
- h.t.: _____

Graph the following. Use <u>degrees or radians</u> as indicated by the problem.

13. $y = \frac{1}{2}\cos\theta + 2$

14. $y = 3sinx - 2$

15. $y = \sin\left[\frac{1}{2}(\theta + 45°)\right]$

16. $y = \cos\left[4\left(x - \frac{\pi}{4}\right)\right]$

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17. $y = 4\sin\frac{1}{3}\theta$

18. $y = -\cos\left(x + \frac{\pi}{2}\right) + 5$

19. $y = 2\cos[3(\theta + 45°)] + 2$

20. $y = -4\sin\left[\frac{4}{3}\left(x + \frac{\pi}{8}\right)\right] - 2$

Write the equation given the transformations or trigonometric vocabulary.

21. Sine equation
v.t. 4
amplitude 2
h.t. -150°

22. Cosine equation
h.t. $\frac{\pi}{3}$
midline $y = -8$
period of 10π

23. Cosine equation
v.d. 7
v.t. -6
h.d. $\frac{1}{4}$

24. Sine equation
reflection
midline $y = 1$
period of 30°
amp 5
h.t. 50°

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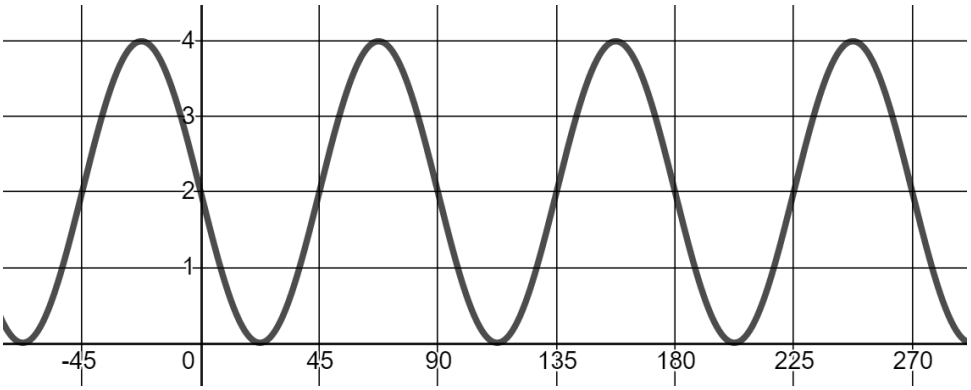
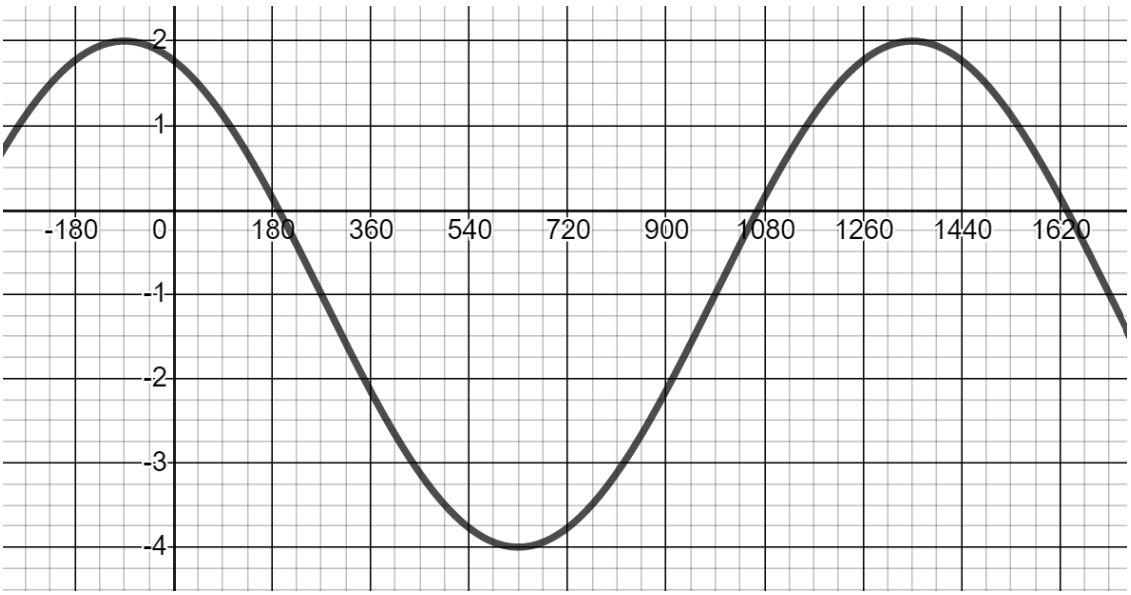
Write at lease one sine equation and one cosine equation for each graph.

25.



26.



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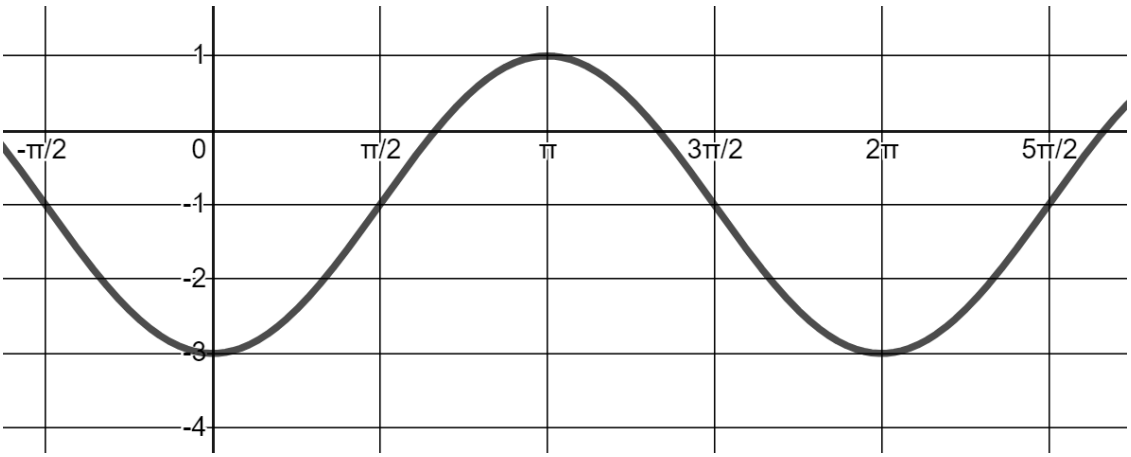

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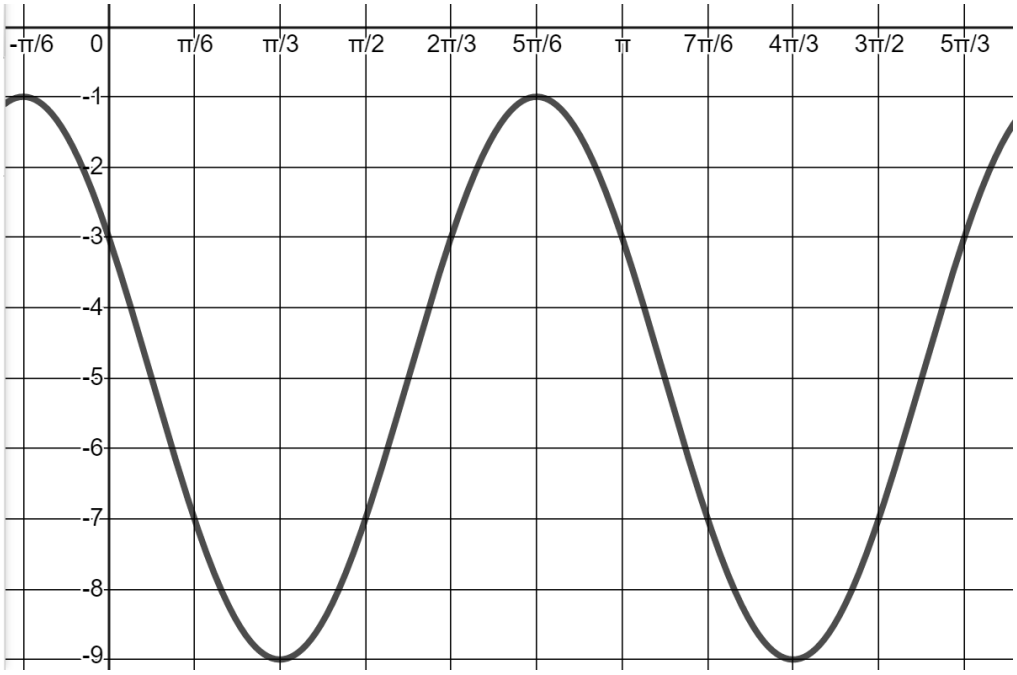
28.



Word problems will not be assessed but they are a good indicator for material you will learn in pre-calc.

29. The temperature in an office is controlled by an electronic thermostat. The temperatures vary according to the sinusoidal function: $y = 19 + 6\sin\left[\frac{\pi}{12}(x - 11)\right]$ where y is the temperature (ºC) and x is the time in hours past midnight.

a.) What is the temperature in the office at 9 A.M. when employees come to work?

b.) What are the maximum and minimum temperatures in the office?

c.) Graph this function.

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30. Each day, the tide continuously goes in and out, raising and lowering a boat (sinuisoidally) in the harbor. At low tide, which occurs at 6am, the boat is only 2 feet above the ocean floor. And, 6 hours later, at peak high tide, the boat is 40 feet above the ocean floor.

a. Graph the boat's *distance above the ocean floor as it relates to time.* Then write a sine function for the graph/scenario.

b. For safety, the boat needs 21 feet of depth to sail. Between what times can the boat go out to sea?

c. What if the safety depth was 14 feet? How could you find the safe times, then?

31. A pet store clerk noticed that the population in the gerbil habitat varied sinusoidally with respect to time, in days. He carefully collected data and graphed his resulting equation. From the graph, determine the amplitude, period, horizontal shift and vertical shift. Write the equation of the graph as:

a. a sine function

b. a cosine function

c. a reflected sine function (- amp.)

d. a reflected cosine function