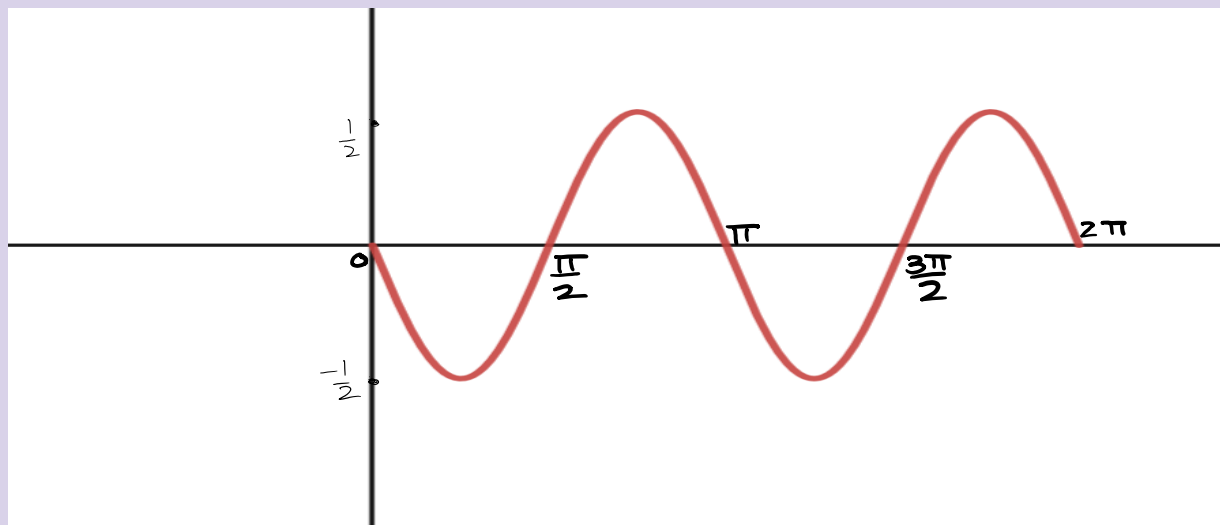


Texts and Materials: (What kinds of pages, passages, problems, graphs, equations, images, etc. are the students working with? Why did you choose these texts? List references for texts including page numbers and, if applicable, links to OER resources. Link to any other materials that might be needed for the lesson.)

I chose a similar question from chapter-4 the book “Trigonometry” 11th edition by Lial, Hornsby, Schneider and Daniels.

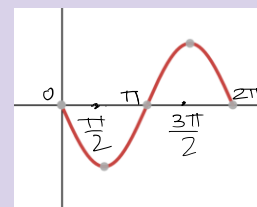
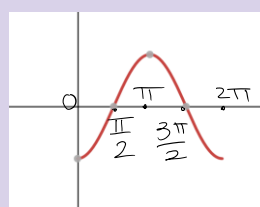
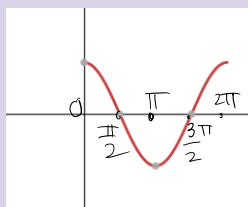
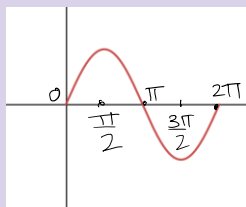
Students often ask me this question during my office hours and said “Somehow I do not understand or Interpret the given graph, or I am just lost, or I do not know where to start from or I hate this type of problems.” By understanding this question student will develop a critical thinking skill; once they see the steps for the answer will give them confident for other similar problems in their course work.

To get access to this particular question one need a permission from www.pearsonhighried.com Determine an equation of the form $y = a \sin bx$ or $y = a \cos bx$ where $b > 0$ for the below graph.

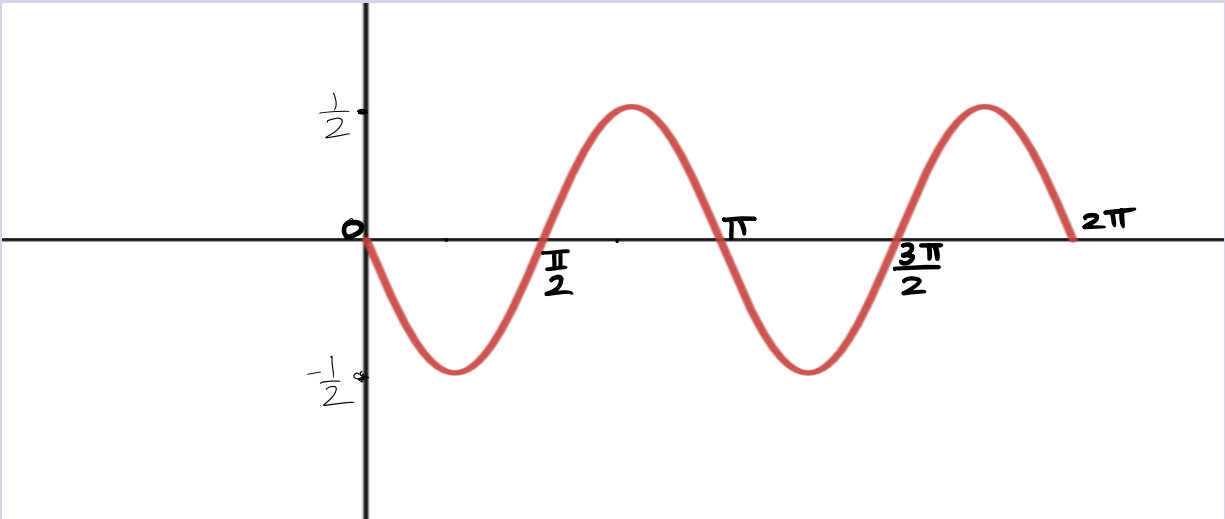


To answer the above the question students will do some group work by understanding and answering the below questions:

- (1) Each of the below graphs is an example of a periodic function. Recognize and write the equation for each of the given graphs of the trigonometric function over one period.



- (2) In general, the graph of a function of the form $y = \sin bx$ or $y = \cos bx$, for $b > 0$, will have a period different from 2π when $b \neq 1$. (True or false)
- (3) What is the formula for the period in the equation $y = a \sin bx$ or $y = a \cos bx$ where $b > 0$



- (4) Do you see some sort of pattern in the graph of the given question?
- (5) How many cycles are shown in the graph of the given question?
- (6) Do we need both cycles to write the equation of the given graph?
- (7) At what x-value the first cycle starts from and where does it end?
- (8) What is $[0, \pi]$ called in your first cycle?
- (9) So, the graph completes a cycle on the interval _____, and the period is _____
- (10) In the interval $[0, \pi]$ what is the name for 0 value?
- (11) In the interval $[0, \pi]$ what is the name for π value?
- (12) What is the difference between maximum x-value & minimum x-value from the interval $[0, \pi]$ and what do you call that difference we just found using the first cycle?
- (13) How do you find the value for b?
- (14) What is the b value do to the graph? For example, $b = 2$ and $b = \frac{1}{2}$
- (15) What is the range of this graph?
- (16) What is the maximum value of the function and minimum value of the function?
- (17) What does the amplitude describe?
- (18) What is the amplitude of the graph? What is the notation for amplitude?
- (19) The graph of $y = a \sin x$ or $y = a \cos x$
 as a _____ of the graph of $y = \sin x$ or $y = \cos x$ when $a > 1$
 and as a _____ of the graph of $y = \sin x$ or $y = \cos x$
 when $0 < a < 1$
- (20) For $b > 0$, the graph of $y = \sin bx$ or $y = \cos bx$
 as a _____ of the graph of $y = \sin x$ or $y = \cos x$ when $b > 1$
 and as a _____ of the graph of $y = \sin x$ or $y = \cos x$
 when $0 < b < 1$

Write the summary of steps to answer the given question using above 20 questions:

Summary:

- ✚ Look at the graph. Recognize the equation of a graph. Find the interval where a graph completes its given cycle.
- ✚ Does the given graph is a reflection of $y = \sin x$ or $y = \cos x$ function graph over the x-axis? What does that mean?
- ✚ Find the period of the graph over one cycle using that interval. The verify using both (all given) cycles.
- ✚ Find the value of b
- ✚ Find the maximum value and the minimum value of the graph of the function
- ✚ Find the amplitude
- ✚ Write the equation of the given graph of the form $y = a \sin bx$ or $y = a \cos bx$ where $b > 0$