Trig 6.3

Complete spaghetti graphs
Identify periodic functions
Use the graphs of sine and cosine functions

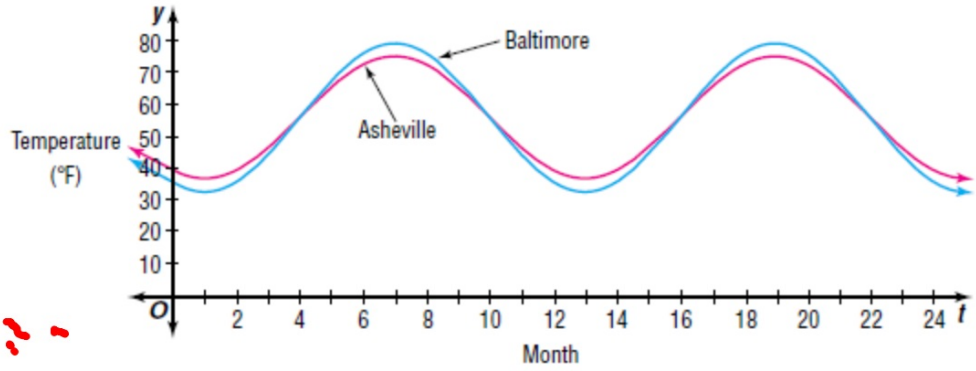
sine = $\frac{opp}{hyp}$

cosine = $\frac{adj}{hyp}$

periodic functions

Quiz 6.1-6.2

METEOROLOGY The average monthly temperatures for a city demonstrate a repetitious behavior. For cities in the Northern Hemisphere, the average monthly temperatures are usually lowest in January and highest in July. The graph below shows the average monthly temperatures (°F) for Baltimore, Maryland, and Asheville, North Carolina, with January represented by 1.



Does it repeat horizontally? How long does it take?

Can it "slide over"?

Periodic ction and Period

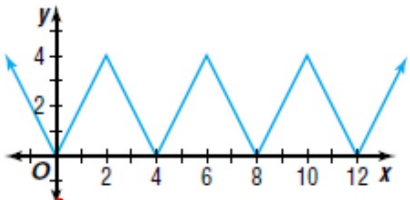
A function is *periodic* if, for some real number α, $f(x + \alpha) = f(x)$ for each x in the domain of f.

What is the length of the repeating unit?

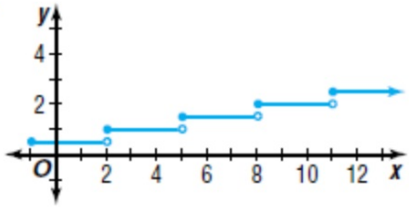
The least positive value of α for which $f(x) = f(x + \alpha)$ is the *period* of the function.

1 Determine if each function is periodic. If so, state the period

a.



b.

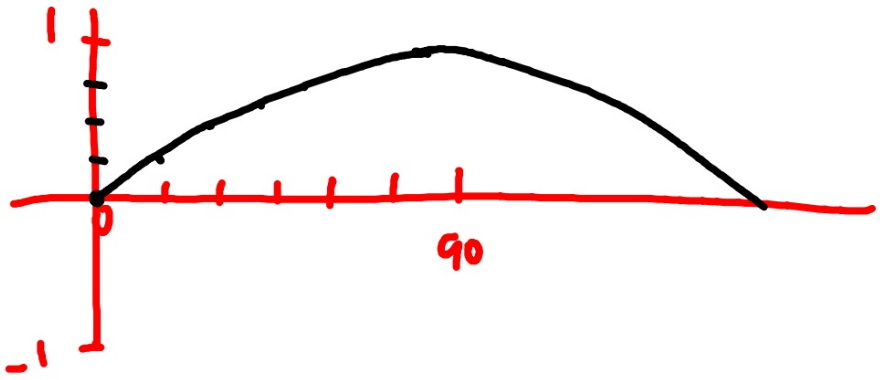


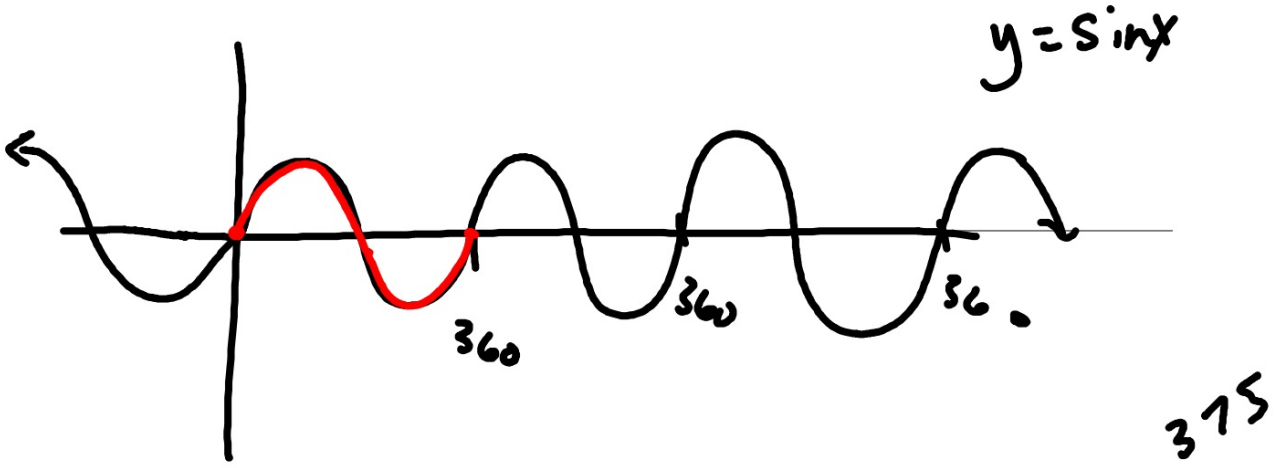
Graphing calculator

set mode to degrees (today) or **radians (usually)**

Make sure you know where you are...

x	sinx
0	0
15	0.26
30	0.50
45	0.71
60	0.87
75	0.97
90	1.00
105	0.97
120	0.87
135	0.71
150	0.5
165	0.26
180	0





Now fill in with radians

Properties of the Graph of $y = \sin x$

1. The period is 2π. (360)
2. The domain is the set of real numbers.
3. The range is the set of real numbers between -1 and 1, inclusive.
4. The x-intercepts are located at πn, where n is an integer. 180°
5. The y-intercept is 0.
6. The maximum values are $y = 1$ and occur when $x = \frac{\pi}{2} + 2\pi n$, where n is an integer.
7. The minimum values are $y = -1$ and occur when $x = \frac{3\pi}{2} + 2\pi n$, where n is an integer.

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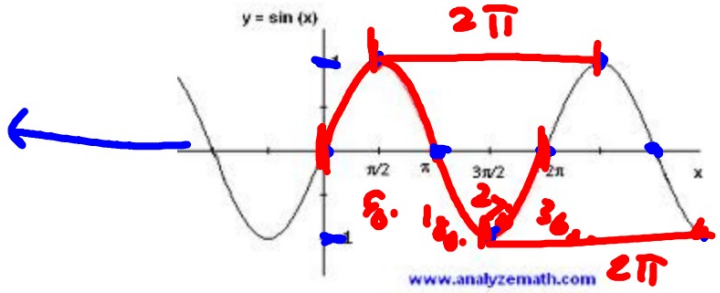

Why does the graph repeat every 2π radians?

$4\frac{1}{2}\pi$

2 Find $\sin \frac{9\pi}{2}$ by referring to the graph of the sine function.

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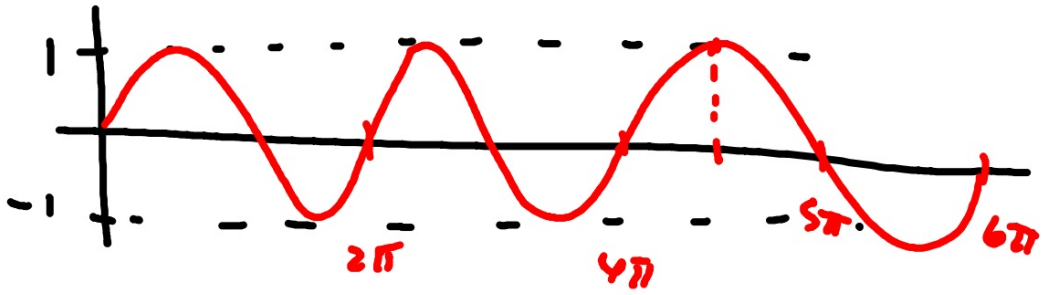

$y = \sin x$

Use the pattern(s) to extend as necessary.

3 Find the values of θ for which $\sin \theta = 0$ is true.

4 Graph $y = \sin x$ for $3\pi \leq x \leq 5\pi$.