Questions from homework

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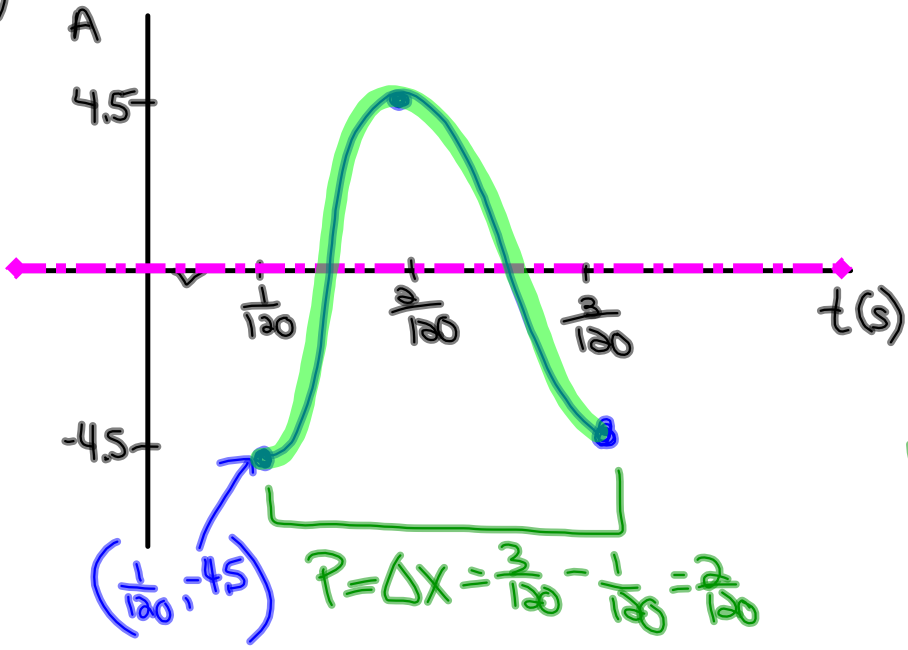


$P = \Delta x = \frac{3}{120} - \frac{1}{120} = \frac{2}{120}$

$a = 4.5$

$d = 0$

$P = 2\left(\frac{1}{120}\right) = \frac{2}{120}$

$P = \frac{1}{60}$

$b = 360 \times \frac{60}{1}$

$b = 21600$

$c = \frac{1}{120}$

$\boxed{y = -4.5\cos\left[21600\left(x - \frac{1}{120}\right)\right]}$

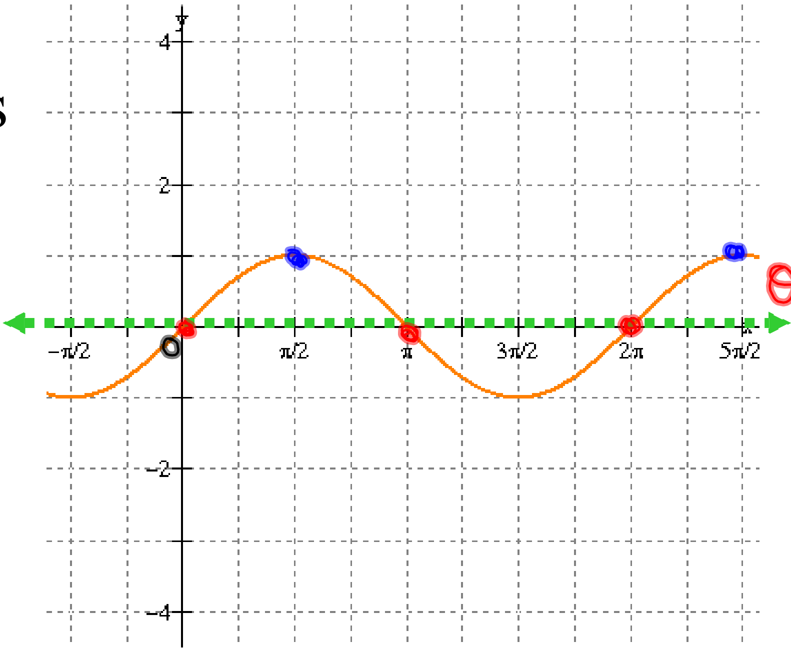
$y = -4.5\cos\left[21600\left(4 - \frac{1}{120}\right)\right]$

Solving Trigonometric Equations Using a Graph

$y = \sin\,\theta$

Where is $\sin\,\theta = 1$

$\theta = \frac{\pi}{2}, \frac{5\pi}{2}$



Where is $\sin\,\theta = 0$

$\theta = 0, \pi, 2\pi$

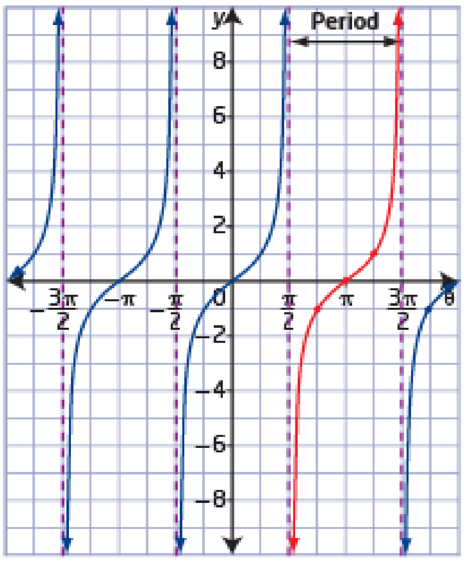
Graph the Tangent Function

Graph the function $y = \tan\theta$ for $-2\pi \le \theta \le 2\pi$. Describe its characteristics.

Solution

The function $y = \tan\theta$ is known as the tangent function. Using the unit circle, you can plot values of y against the corresponding values of θ.

Between asymptotes, the graph of $y = \tan\theta$ passes through a point with y-coordinate -1, a θ-intercept, and a point with y-coordinate 1.



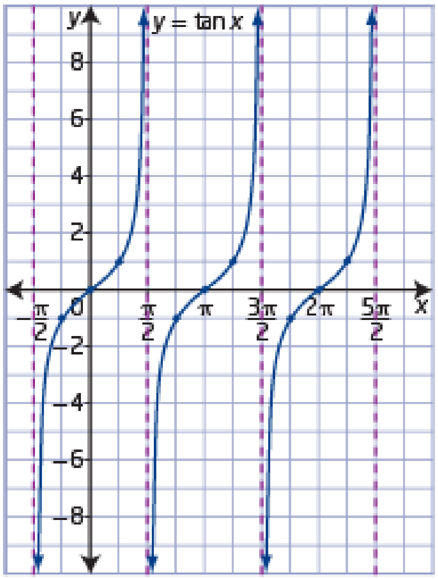
You can observe the properties of the tangent function from the graph.

- The curve is not continuous. It breaks at $\theta = -\frac{3\pi}{2}$, $\theta = -\frac{\pi}{2}$, $\theta = \frac{\pi}{2}$, and $\theta = \frac{3\pi}{2}$, where the function is undefined.
- $\tan\theta = 0$ when $\theta = -2\pi$, $\theta = -\pi$, $\theta = 0$, $\theta = \pi$, and $\theta = 2\pi$.
- $\tan\theta = 1$ when $\theta = -\frac{7\pi}{4}$, $\theta = -\frac{3\pi}{4}$, $\theta = \frac{\pi}{4}$, and $\theta = \frac{5\pi}{4}$.
- $\tan\theta = -1$ when $\theta = -\frac{5\pi}{4}$, $\theta = -\frac{\pi}{4}$, $\theta = \frac{3\pi}{4}$, and $\theta = \frac{7\pi}{4}$.
- The graph of $y = \tan\theta$ has no amplitude because it has no maximum or minimum values.
- The range of $y = \tan\theta$ is $\{y \mid y \in R\}$.

Key Ideas

- You can use asymptotes and three points to sketch one cycle of a tangent function. To graph $y = \tan x$, draw one asymptote; draw the points where $y = -1$, $y = 0$, and $y = 1$; and then draw another asymptote.

How can you determine the location of the asymptotes for the function $y = \tan x$?



- The tangent function $y = \tan x$ has the following characteristics:
  - The period is π.
  - The graph has no maximum or minimum values.
  - The range is $\{y \mid y \in \mathrm{R}\}$.
  - Vertical asymptotes occur at $x = \frac{\pi}{2} + n\pi$, $n \in \mathrm{I}$.
  - The domain is $\left\{x \mid x \neq \frac{\pi}{2} + n\pi, x \in \mathrm{R}, n \in \mathrm{I}\right\}$.
  - The x-intercepts occur at $x = n\pi$, $n \in \mathrm{I}$.
  - The y-intercept is 0.

Homework

Chapter 5 Review:

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