

MATH 133 – Calculus with Fundamentals 1  
Practice on Trigonometric Functions  
September 13, 2017

*Background*

In the video and class yesterday, we have seen a “lightning review” of trigonometry. To practice on some ideas related to this, do the following problems.

*Questions*

1) Sinusoids

- (a) Starting from the graph  $y = \sin(x)$  and using ideas we have seen about scaling and shifting, sketch the graph

$$y = 3 \sin\left(\frac{x}{2}\right) - 1$$

on the interval  $[0, 8\pi]$ .

- (b) The graph in part (a) is an example of a *sinusoid* (or sine-wave graph). The *amplitude* of a sinusoid is one-half the vertical distance between the minimum and maximum values. What is the amplitude of your sinusoid in (a)?
- (c) The *period* of a sinusoid  $f(x)$  is the *smallest strictly positive number*  $T$  for which it is true that  $f(x + T) = f(x)$  for all  $x$ . For example the period of  $f(x) = \cos(x)$  is  $T = 2\pi$ . What is the period of the sinusoid from part (a)?
- (d) Repeat parts (a), (b), and (c) for the graph

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

on the interval  $[-4\pi/3, 4\pi/3]$ .

- (e) Give a formula defining a sinusoid with amplitude  $A = 7$  and period  $T = 5\pi$ . (There is more than one correct answer!)

- 2) By plotting points with  $0 < x < \pi$ , sketch the graph  $y = \cot(x) = \frac{\cos(x)}{\sin(x)}$ . How are  $\tan\left(x - \frac{\pi}{2}\right)$  and  $\cot(x)$  related?