

Trigonometry Practice Exam 3

Kyle Broder – ANU – MSI – 2017

Question 1. Let $f(x) = \tan x$, where $0 \leq x \leq 2\pi$. Let $\tilde{f}(x)$ be the function given by applying the following transformations to $f(x)$:

1. Translate by 3 units in the positive y -direction.
2. Translate by 1 unit in the negative x -direction.
3. Reflect about the y -axis.
4. Dilate by factor 5 from the x -axis.
- a. Determine the equation of $\tilde{f}(x)$.
- b. Are the transformations that are listed above in the correct order? If not, write the transformations in the correct order.
- c. Apply the transformations in the correct order and write the equation for $\tilde{f}(x)$. Does the equation coincide with the expression that was obtained in part (a).
- d. Graph the expressions for $\tilde{f}(x)$ given in part (a) and (c).

Question 2. Graph the function $f : [-2\pi, 2\pi] \rightarrow \mathbb{R}$ defined by

$$f(x) = 3 \sin |x - \pi| - 1.$$

State the domain and range.

Question 3. (Dr. Lloyd Gunatilake). Suppose that $\tan 2x = 3$ for $\frac{\pi}{2} \leq x \leq \frac{3\pi}{4}$. Show that

$$\cos^2 x = \frac{9}{20 + 2\sqrt{10}}.$$

Question 4. Let $\sec x := \frac{1}{\cos x}$. Write the general equation for the asymptotes of the function

$$f(x) = 3 \sec(2x - \pi).$$