Midterm 2 Study Guide

1) Graph \( y = -4\sin(x) + 2 \)

2) Evaluate exactly: \( (\frac{1}{27})^{-4/3} \)

3) State the domain of both \( f \) and \( g \): \( f(x) = \ln(12 - 7x) \) and \( g(x) = e^{-2x - 3} \)

4) Find the exact values of \( \theta \) such that \( \sin(\theta) = \frac{\sqrt{3}}{2}, 0 \leq \theta \leq 2\pi \)

5) Graph \( h(x) = -2\sin\left(\frac{x}{4}\right) \)

6) State the amplitude, phase shift (including direction), vertical shift and period of the function:

\[ y = 25\cos(3\pi x - 12) - \pi \]

7) Solve for \( x \) in terms of logarithms: \( 2401 = 15^{3x+1} \)

8) Find all values of \( \theta \) such that \( \tan(\theta) = 1 \) and \( \tan(\theta) = -1 \), where \( 0 \leq \theta \leq 2\pi \)

9) In the figure below, find each: \( \sin(A), \cos(A), \tan(B), \csc(B), \sec(B), \cot(A) \):

\[
\begin{align*}
\theta &< 0, \\
\sin(\theta) &< 0 \quad \text{and} \quad \cos(\theta) < 0?
\end{align*}
\]

10) Simplify: \( 5e^{-10\ln(x^{1/2})} \)

11) Graph and indicate the horizontal asymptote and two points on the graph: \( y = 2(3^x) - 4 \)

12) Find all values of \( \theta \) such that \( \cot(\theta) = -\sqrt{3}, 0 \leq \theta \leq 4\pi \) (note the \( 4\pi \))

13) Solve for \( x \) where \( b > 1 \): \( \log_b(0 - 2x) - \log_b(x + 5) = 0 \)

14) Fully expand: \( \log(x^3\sqrt{x} - 8) \)

15) Graph one period of: \( y = \tan\left(3\pi x - \frac{\pi}{2}\right) \) (use approximates).

16) Find \( \cos(\theta) \) given that \( \sec(\theta) = \frac{10}{3} \). Calculate \( \csc(\gamma) \) using the reciprocal identity for \( \gamma = 90^\circ, 60^\circ \)

17) Find the domain and range for:

\[ y = 12\cot\left(\pi x - \frac{\pi}{4}\right) \]

\[ y = -3\cos(3\pi x - \pi) + 1 \]

\[ y = 10\sin\left(\frac{2\pi}{3} + \frac{\pi}{4}\right) - 5 \]

18) Draw the Unit circle, for some \( 0 \leq \theta \leq 2\pi \), what quadrants are: \( \tan(\theta) < 0, \sin(\theta) < 0 \) and \( \cos(\theta) < 0 \)?

19) Using (18), state which quadrant (or axis) each angle has its terminal side in: \(-57^\circ, \frac{15\pi}{3}, \frac{7\pi}{3}, 560^\circ, -\frac{15\pi}{2}, \frac{17\pi}{9} \)

20) Write out the following:

20a) Logarithms, exponents

20b) Identities for the trigonometric functions we’ve covered

20c) The 45-45-90 triangle and the 30-60-90 triangle