

EXAM 3 - MATH 140

DATE: Friday, October 28

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find the domain and use your basic knowledge of logarithmic graphs and your graphing techniques to sketch the graph of

$$f(x) = -\log_{1/3}(x - 2) + 1.$$

State clearly all transformations used and label key points on your graphs.

2. Solve the equations

(a) $5^{2x} - 5^{x+1} - 14 = 0$

(b) $\log_{16} x + \log_4 x + \log_2 x = 3.$

3. Suppose that the point $(2, -5)$ is on the terminal side of the angle θ . Find the trigonometric numbers of θ .
4. Suppose that $\tan \theta = \frac{1}{3}$ and that $\pi < \theta < \frac{3\pi}{2}$. Find each of the remaining trigonometric numbers of θ .
5. (a) Sketch carefully the graph of $f(x) = \sin x$ in $0 \leq x \leq 2\pi$.
(b) Use the graph of Part (a) and transformations to obtain a rough sketch of the graph of $g(x) = \frac{1}{2} \sin(x + \frac{\pi}{2}) + 1$.
(You do not get credit if you do not label all relevant points carefully!)
6. (a) Find the amplitude, period and phase shift of the function $f(x) = 3 \cos(-2x + \frac{\pi}{2})$.
(b) Write an equation of a sine function with amplitude $A > 0$, having amplitude 2005, period 10π and phase shift $\frac{5}{7}$. (Do both (a) and (b) carefully in a structured step-by-step way.)