# TEST 9 - MATH 140

## DATE: Friday, March 17

## INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 5 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. (a) Roughly sketch the graph of $f(x) = \sin x$ in one period showing me all important points. (1 point)

   (b) Which transformations should be performed on that graph to obtain the graph of $g(x) = \frac{3}{2}\sin(2x - \pi)$? (2 points)

   (c) Use the second part to obtain a graph of $y = g(x)$. (2 points)

2. (a) Consider the function $f(x) = 2\cos\left(\frac{\pi}{3}x\right)$.

      i. Find its amplitude. (0.5 points)
      ii. Find its period. (1 point)
      iii. Roughly sketch the graph of $f$ based on the amplitude and the period. (1.5 points)

   (b) Consider the graph pictures below.

      i. Find the amplitude. (0.5 points)
      ii. Find the period. (0.5 points)
      iii. Find an equation for the graph shown. (1 point)

3. (a) Sketch the graph of $f(x) = \tan x$ in at least 2 periods showing a few important points. (1 point)

   (b) Describe the transformations to be performed on the graph of $y = f(x)$ to obtain the graph of $g(x) = \tan\left(\frac{1}{2}(x + \frac{\pi}{4})\right)$. (2 points)

   (c) Based on the previous part, provide a rough sketch of the graph of $y = g(x)$ also showing some key points. (2 points)

4. Consider the function $f(x) = -5\sin(6x + 3\pi)$.

   (a) Find its amplitude. (0.5 points)

   (b) Find its period. (1 point)

   (c) Find its phase shift. (1 point)

   (d) Roughly sketch the graph of $f$ based on the amplitude and the period. (2.5 points)

5. Consider the graph pictures below.

(a) Find the amplitude. (0.5 points)

(b) Find the period. (1 points)

(c) Find the phase shift. (1 point)

(d) Find an equation for the graph shown. (2.5 points)