# TEST 1

**(Math 140)**

1. Given the function $f(x)=\dfrac{x+1}{x-3}$, find the following: (20 pts)

   (a) Find the value of $f(1)$

   (b) Solve the equation $f(x)=2$

   (c) Is the point (4,7) on the graph of $f$? (*Note*: Do <u>not</u> do the graph)

   (d) What is the domain of $f$?

2. Given the functions $f(x)=3x$ and $g(x)=1-x^2$, find the following: (10 pts)

   (a) $f\circ g(x)$

   (b) $g\circ f(1)$

3. Given the function $f(x)=2x+1$, find the following: (10 pts)

   (a) Check whether $f$ is one-to-one

   (b) Find $f^{-1}$

4. Do the following problems: (20 pts)

   (a) If $\cos\theta=\dfrac{\sqrt{2}}{\sqrt{11}}, \dfrac{3\pi}{2}<\theta<2\pi$, find $\csc\theta$

   (b) Find the exact value of $\sin(\tan^{-1}\dfrac{1}{2})$

5. Establish the identity $\tan\theta + \dfrac{\cos\theta}{1+\sin\theta} = \sec\theta$. (10 pts)

6. Find the exact value of the following: (10 pts)
(*Note*: Use the *sum* and *half-angle* formulas)

(a) $\sin\dfrac{\pi}{12}$ (b) $\cos 22.5°$

7. Establish the identity $\dfrac{\sec^2\theta}{2-\sec^2\theta} = \sec 2\theta$. (10 pts)

8. Solve the equation $\cos 2\theta = -\cos\theta$ in the interval $0 \le \theta < 2\pi$. (10 pts)