

TEST 1

(Math 140)

1. Given the function $f(x) = \frac{2x}{x-2}$, find the following: (20 pts)

(a) Find the value of $f(4)$ (b) Solve the equation $f(x) = 1$

(c) Is the point $(\frac{1}{2}, -\frac{2}{3})$ on the graph of f ? (d) What is the domain of f ?

(Note: Do not do the graph)

2. Given the functions $f(x) = \sqrt{x+1}$ and $g(x) = \frac{x}{2}$, find the following: (10 pts)

(a) $(f \circ g)(x)$ (b) $(g \circ f)(3)$

3. Given the function $f(x) = 2 - 5x$, 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 $\sin \theta = \frac{4}{5}$, $\frac{\pi}{2} < \theta < \pi$, find $\sec \theta$ (b) Find the exact value of $\sec(\tan^{-1} \sqrt{3})$

5. Establish the identity $1 - \frac{\cos^2 \theta}{1 + \sin \theta} = \sin \theta$. (10 pts)

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

(a) $\cos 105^\circ$

(b) $\tan \frac{\pi}{8}$

7. Establish the identity $\cot 2\theta = \frac{\cot^2 \theta - 1}{2 \cot \theta}$. (10 pts)

8. Solve the equation $\tan \theta = 2 \sin \theta$ in the interval $0 \leq \theta < 2\pi$. (10 pts)