MATH 1010 Calculus I Spring 2012 Secs 1-3 Homework 1

- Week 1 (January 23 - January 27)

① Find the solution to each inequality and show it on a number line sketch:

a) $5x-3 < 7-3x$ b) $x^2+2x-3 \leq 0$ c.) $|x+2| < |x-4|$

Section 1.1 (P. 11) 17, 21, 49, 53, 54, 63

② Express $f(x) = |x| + |x-2|$ as a piecewise defined function and sketch its graph

Section 1.2 (P. 19) 25, 33, 39, 49

③ Sketch the graph of the parabola $y = x^2 - 6x + 4$ by completing the square.

Section 1.3 (P. 28) 7, 11, 13, 21, 51, 53

④ Suppose $\sin(\theta) = \frac{1}{3}$ and $\tan(\theta) = \frac{-1}{\sqrt{8}}$

a) Which quadrant is angle θ in?

b) Find $\cos(\theta)$ and $\sec(\theta)$.

⑤ Prove the identity: $\frac{1}{1-\sin\theta} + \frac{1}{1+\sin\theta} = 2\sec^2\theta$

Section 1.5 (P. 39) 3, 7, 15, 19, 24

⑥ Sketch the graph of $y = 3^{|x|}$.

- Week 2 (January 30 - February 3)

Section 1.6 (P. 50) 1, 2, 23, 29, 32, 41 ab, 45 ab, 47, 65 ac, 66 ab

⑦ Consider $f(x) = \frac{1+3x}{5-2x}$, $0 \leq x \leq 2$, which is one-to-one

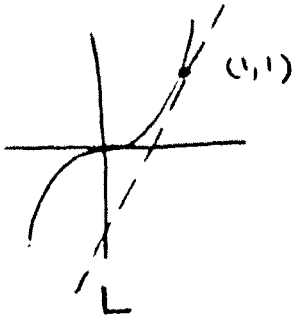
a) Find a formula for $f^{-1}(x)$

b) Find the domain & range of f^{-1}

⑧ Simplify $\sin(\tan^{-1} x)$

- Week 3 (February 6 - February 10)

⑨ Consider $y = x^3$, whose graph appears below:



a) Find a formula for $m(x)$, the slope of the secant line passing through $(1,1)$ and the general point (x, x^3), $x \neq 1$

b) Use synthetic division and a limiting argument to find the slope of tangent line L.

Section 2.2 (P. 73) 2, 3, 5, 11, 23, 27, 35, 37, 47

⑩ show by an example that it's possible for $\lim_{x \to a} f(x)\,g(x)$ to exist even though neither $\lim_{x \to a} f(x)$ nor $\lim_{x \to a} g(x)$ exists.

Section 2.4 (P. 90) 3, 8, 23, 25, 35

Section 2.5 (P. 101) 2, 3, 19, 23, 27, 29, 31, 45, 54, 59

⑪ Suppose $f(x) = \dfrac{x^2 - 2x - 8}{x+2}$, $x \neq -2$

Is it possible to define $f(-2)$ so that $f(x)$ is continuous at $x = -2$? If so, how should $f(-2)$ be defined?

Section 2.6 (P. 114) 9, 13, 17, 19, 27, 39, 57, 81

⑫ if $f(x) = \dfrac{2x^2}{x^2 + 3x - 10}$, find the horizontal & vertical asymptotes of the graph $y = f(x)$.

NOTE Exam # 1 is scheduled for Wednesday, February 15 and will consist primarily of problems similar to those on homework # 1.