

Homework Math 140
Lectures 1 and 2
Will be quizzed Thursday Feb 7

Problem 1 Visit <https://piazza.com/umb/spring2013/math140>. Download the .pdf file with the slides of Lecture 1. The address is <https://piazza.com/umb/spring2013/math140/resources>. Download the .pdf file with this homework from <https://piazza.com/umb/spring2013/math140/resources>.

I strongly encourage you to register at the course. <https://piazza.com/umb/spring2013/math140> Feel free to post questions or otherwise discuss the material at the above address.

- Problem 2**
1. Evaluate and simplify $\frac{f(3+h)-f(3)}{h}$ as a function of h , where $f(x) = 1 - x - 3x^2$.
 2. Evaluate and simplify $\frac{f(a+h)-f(a)}{h}$ as a function of h , where $f(z) = 1 - z - 3z^2$ and a is a parameter.
 3. Evaluate and simplify $\frac{f(x)-f(a)}{x-a}$ as a function of x , where $f(x) = \frac{1}{x}$ and a is a parameter.
 4. Evaluate and simplify $\frac{f(x)-f(2)}{x-2}$ as a function of x , where $f(x) = \frac{x+1}{x+2}$.

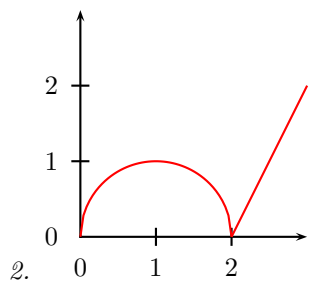
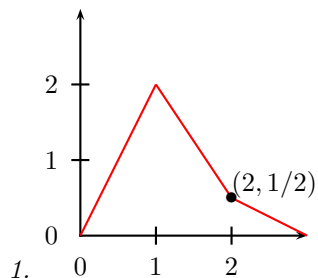
Problem 3 Find the implied domain of the function

1. $f(x) = \frac{x+4}{x^2+3x-4}$.
2. $g(t) = \sqrt{5-t} - \sqrt{3+t}$.
3. $f(x) = \sqrt{3 - \sqrt{3-x}}$.

Problem 4 Plot the piecewise defined functions.

1. $f(x) = \begin{cases} x^2 & x \in (-\infty, 2) \\ x+2 & x \geq 2 \end{cases}$
2. $f(x) := |3 - 5x|$.

Problem 5 Write down formulas for function whose graphs are as follows. The graphs are up to scale. The arc is a part of a circle.



Problem 6 Find the functions $f \circ g$, $g \circ f$, $f \circ f$ and $g \circ g$ and their implied domains.

1. $f(x) = x^2 + 1$, $g(x) = x + 1$.

2. $f(x) = \sqrt{x+1}$, $g(x) = x + 1$.

3. $f(x) = 2x$, $g(x) = \tan x$.

4. $f(x) = \frac{x+1}{x-1}$, $g(x) = \frac{x-1}{x+1}$.

Problem 7 Graph the functions by hand, by applying consecutively the transformations learned in class.

- $y = \frac{1}{x}$.

- $y = \frac{1}{x+1}$.

- $y = \frac{1}{2x+1}$.

- $y = \frac{3}{2x+1}$.

- $y = \frac{3+x}{2x+1}$.

- $y = \left| \frac{3+x}{2x+1} \right|$.