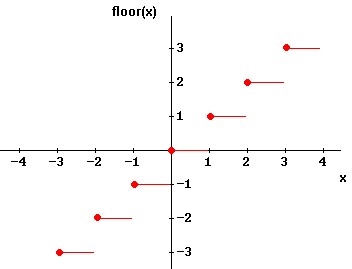
**Chapter 3**

**Functions, Limit and Continuity**

* **Lecture Content:**
* 1.1 (Page 10): Basic Concepts on Functions.
* 1.1 (Page 15): The Vertical Line Test
* 1.1 (Page 15): Piecewise functions.
* 1.1 (Page 16): Absolute Value function.
* 1.1 (Page 16): Example 7 & 8.
* 1.1 (Page 17): Symmetry.
* Also discuss on skew-symmetry function.
* **Floor and Ceiling Function:**

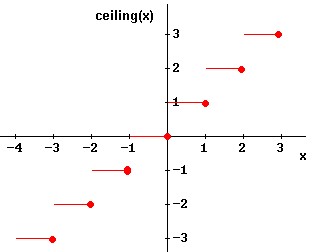
Let be a real number.

The floor function of , denoted by , is the largest integer that is smaller than or equal to .



Example:

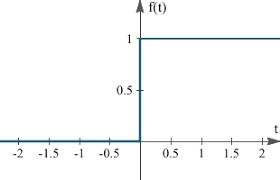
The ceiling function of x, denoted by , is the smallest integer that is larger than or equal to



Example:

* **Unit Step Function:**

We do not define at Rather, at we think of it as in transition between and It is called the unit step function because it takes a unit step at It is sometimes called the Heaviside function.



**Sample Exercise Set 3.1**

1. Find domain and range of the following functions:

(a) (b) (c) (g)

(h) (i)

2. Exercise 1.1: (Page 21) 41 and 43.

3. Exercise 1.1: (Page 22) 57, 61, 62 and 63.

* **Lecture Content:**
* 1.3 (Page 36-40): Transformation of Functions.

**Sample Exercise Set 3.2**

Sketch the graph of the following functions:

(a) (b) +2, (c)

(d) (e) (f) ,

(g) (h) (i) (j)

(k) (l) (m)

* **Lecture Content:**
* 2.2 (Page 83): Limit of a function.
* 2.2 (Page 87): One sided limit.
* 2.2 (Page 88): Example 7.
* 2.2 (Page 90): Vertical Asymptote.

**Sample Exercise Set 3.4**

1. Sketch and find limit of the function at

1. Sketch and Find limit of the function at and

2. Sketch and find limit at and of

* **Lecture Content:**
* 2.3 (Page 95): Calculating limits using the limit laws.
* 2.3 (Page 97-101): Example 2- Example 10.

**Sample Exercise Set 3.5**

Exercise 2.3 (Page-103) 47 & 50.

* **Lecture Content:**
* 2.5 (Page 114-115): Continuity- just definition.
* 2.5 (Page 115): Example 2.

**Sample Exercise Set 3.6**

Exercise 2.5 (Page 124) 17 & 18.

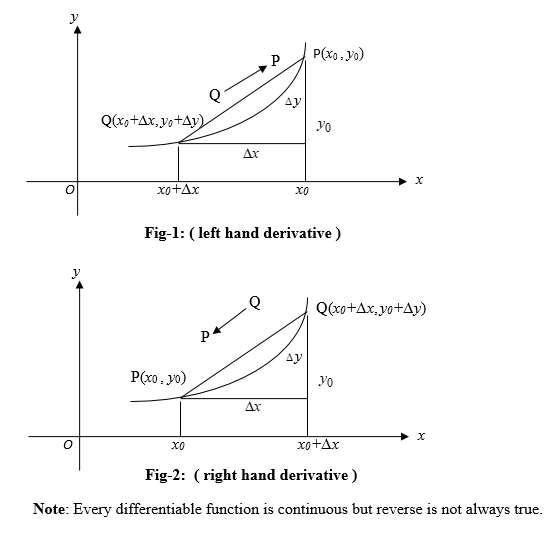
Exercise 2.5 (Page 125) 39 & 40.

* **Lecture Content:** 
  + **Differentiability of a function:**

Let the function  be defined on an open interval *I* and . The function  is said to be differentiable at if

* 

exists, i.e., **left hand derivative**  is equal to **right hand derivative**  .



**Sample Exercise Set 3.7**

1. Sketch the following graphs and determine whether functions are differentiable at the indicated points:

(a) at , (b) , at,

(c) 

* **Lecture Content:**
* **Basic formula and rules of differentiation.**

**Sample Exercise Set 3.8**

1. Using 1st principal of differentiation find and

2. Find from the following functions:

(a) (b) (c) (d) (e) (f)

(g) (h) (i) (j) (k)

(l) (m)