1. An IITian is *smart* if there exists some day N of his (indefinite) stay in IIT such that for any day $n \geq N$, the IITian solves tutorial sheet problems on day n. Who is a non–smart IITian?

2. An IITian is *super smart* if there exists some day N of her stay in IIT such that for any day $n \geq N$, if n is a working day, the IITian solves tutorial sheet problems on day n. Who is a non–super smart IITian?

3. Examples of graphs of functions with and without breaks at a certain point of their domain.

4. (SC) Sequential criterion: for every sequence $x_n \to c$, assuming $x_n \in$ domain(f), it should be true that $f(x_n) \to f(c)$.
   OPP.(SC): there exists a sequence $x_n \to c$ such that $x_n \in$ domain(f) but $f(x_n) \not\to f(c)$.

5. (WC) Weierstrass criterion: for any real $\epsilon > 0$, there exists a real $\delta > 0$ such that for every x satisfying $|x - c| < \delta$, if $x \in$ domain(f), it should be true that $|f(x) - f(c)| < \epsilon$.
   OPP. (WC): there exists a real $\epsilon_0 > 0$ such that for any real $\delta > 0$, there exists an $x_\delta \in$ domain(f) which satisfies $|x_\delta - c| < \delta$ but it is true that $|f(x_\delta) - f(c)| \geq \epsilon_0$.

6. Proof of OPP.(WC) implies OPP.(SC). This proves (SC) implies (WC).

7. Proof of (WC) implies (SC).

8. Domain: A subset $A \subset \mathbb{R}$ is a *domain* if for every $c \in A$, at least one one of the following three types of sets $[c, c + \alpha_0)$, $(c - \alpha_0, c + \alpha_0)$ or $(c - \alpha_0, c] \subset A$ for some real $\alpha_0 > 0$.

9. Suppose $f : A \to \mathbb{R}$ is a function on a domain A. Say f is *continuous at* c by (SC) $\equiv$ (WC). Say f is *continuous* if it is continuous at every point of its domain.

10. In domain(f), 'domain' associates an object to a function f. In a subset $A \subset \mathbb{R}$ being a domain, 'domain' is an adjective for subsets of reals.

11. Proof that the constant, identity and square functions are continuous by (WC).

12. Exercise: continuity of power, modulus, exponential and root functions.

1. Rules about continuity of resultant function at a point/over domain with respect to operations of addition, subtraction, multiplication, division and composition.

2. Applications: Continuity of polynomial and rational functions.

3. Non-traditional functions like Dirichlet's and Thomae's examples.

4. Thousand Dollar Challenge: Find a function from reals to reals which is discontinuous at irrationals and continuous at rationals.

5. A function is *bounded* if its range is bounded. *Supremum of a function* is the supremum of its range. Likewise infimum.

6. A function *has an absolute maximum* if it attains its supremum. Likewise for *absolute minimum.*

7. Examples for functions which are unbounded and do not attain their sup/inf on $\mathbb{R}$, on half–rays, on bounded intervals of various kinds.

8. Failure to produce such examples on intervals of type $[a, b]$ for real $a \leq b$.