Supremum and Infimum: (1) Defn: Given a fu. f: A -> B, we cay that the for is: - bounded from above if the image f (A) is bounded from above is. I MER s.t. f(x) &M, YXEA. - similarly def"s for bounded from below, bounded or imbounded. eg: f(n) = 12 is bounded from below. g(n) = - x2 - - - - above. sinx is bounded from orbors as well as below. Defn: lyinen a set SCIR, (1) The supremum of S, denoted by sup S, is the real no defined as the least upper bound (l.u.b.) of the ret S. ie. (i) x = Sup S NXES, (ii) + 270, 3x ES st. x> sup S-E.

(2) The infimum of S, duroted by inf S, is the real no defined as the higgerst upper bound / greatest upper bound (bub/gub) of the set S. ice. (i) an inf S xxES,

(ii) 4570, 3x E x E, 0534 (ii)

Defn: ejven a fn f:A -> B,

(1) If f is bounded from above, the supremen of the fr. donoted by sup, f, is defined to be the supremun of the image

(2) If fir not bounded from above, sup of = + 00.

(3) If f is bounded from below, the infinum of the for, denoted by inf , is defined to be the infimum of the image (4) If f is not bounded from below, infa $f = -\infty$. f(A).

· infaf = f(x) = supaf &x EA.

· infaf = sup Af iff f(a) is constant (we the previous point.)

· For A'CA and f: A -> B we have, int of & int a, f & sup of & sup of. eg: f(x)=x, A=[0,3], A=[1,2].

Defn: (1) If sup of Ef(A), we say that the for fadmits a maximum in the domain A and supf = max Af.

(2) If inf Af Ef (A), we say that the fur f admits a minimum in the domain A and inf of = min of.

Defn: Any pt-x of the domain 2.t. of (2) = max Af is called max. pf. and any pt. x of the domain 8.t. f(x) = min Af is called min pt.

· Maximum pts. need not be unique, f(n)=n, A=[-2,2].

· hax or min might not exist even if the for is bounded. eg: f(n) = n, A= (-1,1).