$$\boxed{\text{All limit laws that apply in 1-D apply in 2-D.}}$$

A 2-D limit converts to a bunch of regular 1-D limits by using limit laws:

$$\lim_{(x,y)\to(c,d)} xy = \left(\lim_{(x,y)\to(c,d)} x\right)\left(\lim_{(x,y)\to(c,d)} y\right) = \lim_{x\to c} x \cdot \lim_{y\to d} y$$

Continuity

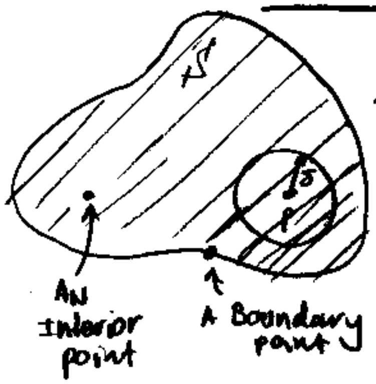
1-D	2-D
$y = f(x)$ is continuous at $x=c$ if and only if $\lim_{x\to c} f(x) = f(c)$	$z = f(x,y)$ is continuous at $(x,y)=(c,d)$ if and only if $\lim_{(x,y)\to(c,d)} f(x,y) = f(c,d)$

1) f is defined
2) lim f exists
3) Results in 1) and 2) are the same

As usual,

1) Continuous on a set = = continuous at every point of the set
2) Sum, difference, product, composition, Ratio of continuous functions is continuous (subject to regular restrictions)

Some definitions from Analysis



1) Neighborhood of Radius δ of a point P = set of all points Q such that $d(P,Q) < \delta$
2) A point P is called an interior point if there exists a neighborhood contained in S
3) A point P is called a boundary point if every neighborhood of P contains both points from S and not from S
4) Boundary = set of all boundary points (not necessarily belongs to S)
5) A set is closed if it contains all its boundary pts
6) A set is open if all its points are interior pts.