

Assumes real valued f's

Continuity  $\rightarrow$  Domains. All continuous on their domains.

## I. Algebraic functions.

1. Polynomial functions,  $f(x)$   $[-\infty, +\infty)$

2. Rational functions,  $\frac{f(x)}{g(x)}$   $[-\infty, +\infty)$  except where  $g(x)=0$ ,  
(asymptote)  
always one jump dis. at each  $x$  value where  $g(x)=0$ .

3. Radical functions,  $\sqrt[n]{f(x)}$

a) where  $n$  is odd  $[-\infty, +\infty)$

b) where  $n$  is even  $[-\infty, +\infty)$  except where  $f(x) < 0$ ,  
where this happens no  $x$  values exist.

## II. Transcendental Functions.

1. Logarithmic functions,  $\log_a f(x)$ , given  $a > 0$ .

$[-\infty, +\infty)$  except where  $f(x) \leq 0$ ,  
where this happens no  $x$  values exist.

2. Exponential functions,  $a^{f(x)}$   $[-\infty, +\infty)$

3. Trigonometric functions.

a)  $\sin[f(x)]$  &  $\cos[f(x)]$   $[-\infty, +\infty)$

b) all the rest dis. at asymptotes (Jump)

4. Inverse Trig. functions.

a)  $\sin^{-1}[f(x)]$   $-\frac{\pi}{2} < f(x) < \frac{\pi}{2}$

b)  $\cos^{-1}[f(x)]$   $0 < f(x) < \pi$

c)  $\tan^{-1}[f(x)]$   $[-\infty, +\infty)$

d) all the rest vary.