

Curve Sketching Guidelines Section 3.4

1. **DOMAIN:** Find all values of x for which $f(x)$ is defined.
2. **INTERCEPTS:**
 - (a) x-intercepts: let $y = 0$, and solve for x
 - (b) y-intercepts: let $x = 0$, and solve for y
3. **SYMMETRY:**
 - (a) y-axis: if $f(-x) = f(x)$
 - (b) origin: if $f(-x) = -f(x)$
4. **ASYMPTOTES:**
 - (a) Vertical asymptotes: Find the values of a for which $\lim_{x \rightarrow a} f(x) = \infty$ or $\lim_{x \rightarrow a} f(x) = -\infty$
(NOTE: for a rational function, find where the denominator is equal to zero.)
 - (b) Horizontal asymptotes: If $\lim_{x \rightarrow \infty} f(x) = L$ or $\lim_{x \rightarrow -\infty} f(x) = L$ then $y = L$ is a horizontal asymptote.
5. **INCREASING/DECREASING:**
 - (a) Increasing when $f'(x) > 0$.
 - (b) Decreasing when $f'(x) < 0$.
6. **LOCAL MAX/MIN:**
 - (a) Local Max: $f(c)$ is a local max if $f'(x)$ changes from + to - at c .
 - (b) Local Min: $f(c)$ is a local min if $f'(x)$ changes from - to + at c .
7. **CONCAVITY:**
 - (a) Concave up when $f''(x) > 0$
 - (b) Concave down when $f''(x) < 0$
8. **POINTS OF INFLECTION:** P is point of inflection if the concavity of f changes at P . (NOTE: to be a point of inflection P must be in the domain of f .)
9. **SKETCH GRAPH**