4.5 - Summary of Curve Sketching

The book's steps seems OK to do this, so let's follow that.

A. Find the domain of f(x)

B. Intercepts - put in x = 0 for the y-intercept,
and find the roots to get the x-intercept(s).

C. Symmetry - if f(x) = f(-x) for all x's, then the
function is even (symmetric about the y-axis)
If f(-x) = -f(x), then the function is odd
(symmetric about the origin - rotate 180°)

more...

D. Asymptotes - if $\lim_{x \to \infty} f(x) = L$ or $\lim_{x \to -\infty} f(x) = L$

then there is a horizontal asymptote at y = L. Basically, check out the end behavior.

Vertical asymptotes occur if you're dividing by 0 (once you've canceled common factors on the numerator and denominator (holes)).

Slant asymptotes occur, sometimes, in rational functions when the degree of the numerator is one more than the degree of the denominator

E. Intervals of increase or decrease - find f', see when it's + or - to determine if f is increasing or decreasing. The intervals begin and end at critical points...

F. Local Maximums and Minimums - these occur at critical points (usually the roots of f'). If f changes directions on either side of these roots, then it's some sort of local extrema. Put the roots of f' into f to find the heights of these peaks and valleys.

G. Concavity and Points of Inflection - The 2nd derivative test, where you find the roots of f" and then find the signs of it - if f" is +, then f is concave up. If f" is -, then f is concave down. Inflections points are where the concavity changes.

H. Sketch it! - make smart scales and plot points first.