A Guide to Curve Sketching

Given a function $f(x)$, we can combine all of the information we know about the function to help sketch the graph of $y = f(x)$.

1. Determine the domain of f

2. Determine the behaviour of f as x tends towards ∞ and $-\infty$

3. Find all horizontal and vertical asymptotes of f

4. Determine the intervals of increase and decrease

5. Find the relative extrema of f

6. Determine the intervals of concavity

7. Find the inflection points of f

8. Sketch the graph (you may use the steps given below)

Once you have obtained the information above, I suggest the following process for actually drawing the graph:

1. Plot any vertical or horizontal asymptotes of the graph (with a dotted line AND an equation).

2. Plot any holes in the graph (points outside the domain which do not define asymptotes).

3. Plot the relative extrema. When plotting a relative max, draw a small hill surrounding it. When plotting a local min, draw a small valley surrounding it.

4. Plot all inflection points.

5. Between any two points (or between a point and an asymptote), check if that section of curve is increasing/decreasing and concave up/down. Connect the two points appropriately, or approach the vertical asymptote in the correct direction (∞ or $-\infty$).

6. Ensure your graph has no sharp corners and passes through all plotted points. Label each plotted point with its (x, y)-coordinates.