Consider the following functions:

$$f_1(x) = x^4 - 2x^3 - 15x^2 - 4x + 9$$
$$f_2(x) = e^x \sin(\sqrt{3}x)$$
$$f_3(x) = \frac{(x+2)(x+4)}{(x-3)^2} = \frac{x^2+6x+8}{(x-3)^2}$$

For the function f_i assigned to your group:

1. Find the critical numbers of f_i, and classify each critical number as a local min, local max, vertical asymptote, or none of the above. (Hints: For f_1, $x = -2$ is one critical number; for f_2, note that $\tan\theta$ is periodic with period π.)

2. In the regions on the x-axis between critical numbers, find the regions where f_i is increasing and where f_i is decreasing.

3. Using pencil or something else you can erase, draw a "stick figure" (piecewise linear) graph of f_i to match the information from (1)–(2). I.e., your graph should be made of line segments, it should show where f_i is increasing and decreasing, and it should have accurate x- and y-coordinates for the graph of f_i at the critical numbers of f_i. (For f_2, draw the portion of the graph with $-\frac{4\pi}{\sqrt{3}} \le x \le \frac{4\pi}{\sqrt{3}}$.)

4. Find the zeros of $f_i''(x)$.

5. In the regions on the x-axis between zeros of $f_i''(x)$, find the regions where f_i is concave up and where f_i is concave down.

6. Revise your "stick figure" graph from (3) with the concavity information from (5). Also, add in accurate x- and y-coordinates for the graph of f_i at the zeros of f_i''.)