Graph Sketching of Functions

29. Carefully sketch the graph of the function

$$f(x) = \frac{x}{x - 3}$$

(Determine the domain, zeros, limits at the boundaries of the domain, asymptotes, intervals of increase and decrease, local extrema, intervals of convexity and concavity, and inflection points).

30. Carefully sketch the graph of the function

$$f(x) = \frac{3x}{1 + x^3}$$

(Determine the domain, zeros, limits at the boundaries of the domain, asymptotes, intervals of increase and decrease, local extrema, intervals of convexity and concavity, and inflection points).

31. Carefully sketch the graph of the function

$$f(x) = \frac{x - 2}{x^2 - 3}$$

(Determine the domain, zeros, sign of the function, limits at the boundaries of the domain, asymptotes, intervals of increase and decrease, local extrema, intervals of convexity and concavity, and inflection points, if they exist).

32. Carefully sketch the graph of the function

$$f(x) = \frac{x^2 - 6x + 3}{x - 3}$$

(Determine the domain, zeros, limits at the boundaries of the domain, asymptotes, intervals of increase and decrease, local extrema, intervals of convexity and concavity, and inflection points).

33. Carefully sketch the graph of the function

$$y = \frac{1}{x^2} \ln x$$

(Determine the domain, zeros, limits at the boundaries of the domain, asymptotes, intervals of increase and decrease, local extrema, intervals of convexity and concavity, and inflection points).

34. Carefully sketch the graph of the function

$$y = \frac{1}{x - 3} \ln x$$

(Determine the domain, zeros, limits at the boundaries of the domain, asymptotes, intervals of increase and decrease, local extrema, intervals of convexity and concavity, and inflection points).

35. Carefully sketch the graph of the function

$$f(x) = \frac{e^x - e^{-x}}{e^x}$$

(Determine the domain, zeros, limits at the boundaries of the domain, asymptotes, intervals of increase and decrease, local extrema, intervals of convexity and concavity, and inflection points).

36. Carefully sketch the graph of the function

$$y = x^3 e^{-\frac{x^2}{6}}$$

(Determine the domain, zeros, limits at the boundaries of the domain, asymptotes, intervals of increase and decrease, local extrema, intervals of convexity and concavity, and inflection points).