MATH 1000

Worksheet on Graphing

1. For each of the following polynomial functions

(a) Make a table of signs for $f'(x)$. Determine where the function is increasing and decreasing and find all extreme points.

(b) Make a table of signs for $f''(x)$. Determine where the function is concave up and concave down and find all inflection points.

(c) Sketch the graph of the function and label all extreme points, inflection points and intercepts. (Use exact values for all coordinates.)

1. $f(x) = x^3 - 3x^3 - 2 = (x+1)^2(x-2)$
2. $f(x) = \frac{1}{9}x^4 - 2x^2$
3. $f(x) = x^4 - 8x^3 + 18x^2 + 1$
4. $f(x) = 3x^5 - 5x^3$

2. For each of the following rational functions

(a) Find the equations of all horizontal and vertical asymptotes.

(b) Make a table of signs for $f'(x)$. Determine where the function is increasing and decreasing and find all extreme points.

(b) Make a table of signs for $f''(x)$. Determine where the function is concave up and concave down and find all inflection points.

(c) Sketch the graph of the function and label all asymptotes, extreme points, inflection points and intercepts. (Use exact values for all coordinates.)

1. $f(x) = \dfrac{x(x-3)}{(x-1)^2}$
2. $f(x) = \dfrac{x}{x^2+3}$
3. $f(x) = \dfrac{3x^2-1}{x^3}$
4. $f(x) = \dfrac{x-2}{(x-1)^2}$